Results of Additional Soil Borings and Laboratory Testing

TH 7 and Louisiana Avenue Reconstruction
St. Louis Park, Minnesota

Prepared for

Short Elliott Hendrickson, Inc.

Project BL-09-00745B
September 27, 2012

Braun Intertec Corporation

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September 27, 2012 Project BL-09-00745B

Mr. Brent Theroux, PE
Short Elliott Hendrickson, Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110

Re: Additional Soil Borings and Laboratory Testing
TH 7 and Louisiana Avenue Reconstruction
St. Louis Park, Minnesota

Dear Mr. Theroux:

We have completed the additional soil borings and laboratory testing requested by Short Elliott Hendrickson, Inc. (SEH) for the reconstruction of Trunk Highway 7 (TH 7) and Louisiana Avenue in St. Louis Park, Minnesota.

Scope of Services

Our work was completed in general accordance with our Proposal for Additional Soil Borings and Laboratory Testing to SEH, dated June 11, 2012 and SEH authorized scope changes.

For the project, our scope of services included the following:

- Site reconnaissance and onsite meeting with SEH to coordinate access.
- Clearance of public utilities.
- Acquiring a MnDOT Trunk Highway Right-of-Way and City of St. Louis Park Public Works Permits.
- Coordination of traffic control in accordance with the approved permits.
- Performing nineteen continuous direct-push borings at the requested locations to nominal depths of 20 to 50 feet below grade (original scope included seventeen continuous push borings).
- Performing twenty seven cone penetration test (CPT) soundings to nominal depths of 30 to 50 feet below grade.
- Collecting excess drilling fluid and soil cuttings, placing in steel drums and moving to an onsite location for temporary storage and disposal by the owner.
- Laboratory testing as requested by SEH.
- Preparation of this factual soil boring report.

Documents Provided

SEH provided us preliminary aerial figures of the project area and requested boring locations prior to drilling and final aerial figures of the boring locations after completion of the drilling.

For the purposes of this report, SEH provided us with an untitled soil boring location map reflecting the surveyed boring locations. A copy of this map in included in Appendix A for reference.

Boring Locations and Elevations

We performed a total of nineteen continuous push borings and twenty seven CPT soundings. SEH provided the following unique names for the borings and soundings listed in Table 1.

Table 1. Boring and Sounding Summary

Boring Type	Quantity	Unique Name
Continuous Push	19	C-13, C-14, C-16, C-19 to C-21, C-23, C-25 to C-27, C-29, C-30, C-34 to C-36, X-1 to X-4
CPT	27	C-13 to C-39

The borings were performed at the approximate locations shown on the attached soil boring map provided by SEH.

The boring locations were also selected and staked by SEH. Boring coordinates and ground surface elevations at the boring locations were provided by SEH.

Drilling and Sampling

Continuous Push Borings

The soil borings were advanced using a track-mounted direct-push (GeoProbe) sampling rig. Using the direct-push rig, a plastic soil-retention sleeve was placed into a 3.25-inch outside-diameter by 5-foot-long sampling tool. The borehole was advanced using a dual-tube system, which allows for the inner sampling tool to be pushed through a larger outer diameter rod a total penetration depth of 5 feet. After advancing the tooling, the sampler was removed from the borehole but the outer rod remains, leaving the borehole open. The soil sample was retrieved inside the plastic sleeve for visual inspection. The process is then repeated on a continuous basis to the termination depths of the borings.

Cone Penetration Test Soundings

The CPT soundings were performed with an off-road CPT rig by advancing a Vertek piezocone with pore pressure and seismic capabilities. The soundings were performed in accordance with ASTM D 5778. As the cone was advanced, tip resistance (Q_t), sleeve friction (F_S) and pore pressure (U_2) were measured continuously.

Sample Storage

The plastic sleeves were returned to our Minneapolis office for classification and lab testing. Representative samples will remain in our Minneapolis office for a period of 90 days to be available for your examination.

Log of Boring Sheets

Log of Boring sheets for our continuous push borings are included in Appendix A of this report. The logs identify and describe the geologic materials that were penetrated, laboratory tests performed on samples retrieved from them, and groundwater measurements.

Strata boundaries were inferred from changes in the samples. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

Cone Penetration Test Sounding Logs

CPT Sounding Logs are included in Appendix B of this report. The CPT sounding logs report the tip resistance, sleeve friction and pore pressure that was measured continuously by the cone as it was advanced. The normalized friction ratio, undrained shear strength, and soil behavior type were calculated from the raw data. The graphical SBT is based upon the relationship between normalized tip resistance and friction ratio (Robertson 1990). Direct observation of the soils does not occur with CPT soundings.

Soil Classification

The soils encountered during the continuous push borings were visually and manually classified in general accordance with the MnDOT Triangular Textural Soil Classification System. A chart explaining the classification system is attached.

Laboratory Testing

Laboratory testing was performed as requested by SEH. Tests performed included moisture content, organic content, sieve analysis, and Atterberg limits. Tests were performed in accordance with MnDOT or ASTM procedures and as referenced on the specific test reports.

The tests are shown or noted on the right side of the Log of Boring Sheets, across from the associated sample. The sieve analysis and Atterberg limits test results are also shown graphically on separate sheets included in Appendix C of this report.

Groundwater Observations and Borehole Abandonment

The drillers checked for groundwater as the continuous push borings were advanced. The boreholes were then backfilled with bentonite grout after completion in accordance with Minnesota Department of Health regulations.

As requested by SEH, excess soil cuttings and drilling fluid generated during completion of the borings was collected and placed in steel drums. The drums were labeled and dated and moved to the City owned parking lot on the southwest corner of TH 7 and Louisiana Avenue. Braun Intertec holds no responsibility for the storage or disposal of the cuttings after collection and placement at the designated storage location.

Groundwater Fluctuations

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation period was relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

Level of Care

In performing our services, Braun Intertec has used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of our profession currently practicing in the same locality. No warranty, express or implied, is made.

General

Please refer to the attached report for a detailed summary of our procedures and results. We appreciate the opportunity to be of service to you on this project. If you have any questions regarding this report, please contact Josh Van Abel at 952.995.2310 or Matt Ruble at 952.995.2224.

Sincerely,

BRAUN INTERTEC CORPORATION

Joshua J. Van Abel, PE
Associate Principal – Senior Engineer

Holly Vetter for:
Matthew P. Ruble, PE
Principal Engineer

Appendix A:
Soil Boring Location Map (Provided by SEH)
Log of Boring Sheets C-13, C-14, C-16, C-19 to C-21, C-23, C-25 to C-27, C-29, C-30, C-34 to C-36, X-1 to X-4

Appendix B:
Cone Penetration Test Results C-13 to C-39

Appendix C:
Grain Size Accumulation Curves (3 Sheets)
Atterberg Limits Result (1 Sheet)
Descriptive Terminology of Soil (MnDOT)

Appendix A

SCALE 100'

CPT

GEOPROBE

WALKER ST.

W. LAKE ST.

LOUISIANA AVE

EB IH 7

C-13 C-14 C-15 C-16 C-17 C-18 C-19 C-20 C-21 C-22 C-23 C-24 C-25 C-26 C-27 C-28 C-29 C-30 C-31 C-32 C-33 C-34 C-35 C-36 C-37 C-38 C-39

X-1 X-2 X-3 X-4

MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-13**	**892.9** *(Surveyed)*

Location: Co. Coordinate: X=502797 Y=153297 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **7/31/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.5 891.4		SANDY LOAM, slightly plastic, dark brown, moist. (Topsoil Fill)							
5			SANDY LOAM, slightly plastic, with Gravel and occasional Peat seams, brown and dark brown, moist. (Fill) Mostly Gravel from 6 to 7 feet.							
	7.0 885.9		PEAT, partially decomposed, black, wet. (Swamp Deposit)							
	7.5 885.4		LOAMY SAND, fine- to coarse-grained, with Gravel and possible Cobbles, brown, moist to waterbearing. (Glacial Outwash)							
	9.5 883.4									
10				CS						Note: Possible chemical odor from 11 to 20 feet.
15			SAND, fine- to coarse-grained, trace Gravel, gray to black, waterbearing. (Glacial Outwash)							
20	20.0 872.9		Bottom of Hole - 20 feet. Water observed at 9 feet while drilling. Boring immediately backfilled with bentonite grout.							

Index Sheet Code 3.0

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-14**	**897.3** *(Surveyed)*

Location: Co. Coordinate: X=502795 Y=153375 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **8/3/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.1 896.2		13 1/2 inches of bituminous.							
			LOAMY SAND, fine- to coarse-grained, with Gravel, brown, moist. (Fill)							
5	5.0 892.3		SANDY LOAM, non-plastic, with Gravel, wood and Cobbles, brown and dark brown, moist. (Fill)							
10	10.0 887.3		CLAY, organic, trace Gravel, black, wet. (Swamp Deposit)	CS		32				OC=6%
▼	14.0 883.3									
15			LOAMY SAND, fine- to coarse-grained, trace Gravel, gray and brown, waterbearing. (Glacial Outwash)							
20										* Water observed at 14 feet while drilling. Boring immediately backfilled with bentonite grout.
25	25.0 872.3		Bottom of Hole - 25 feet.*							

Index Sheet Code 3.0

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-16**	**897.4** *(Surveyed)*

Location: Co. Coordinate: X=502893 Y=153397 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **8/3/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.2 896.2		14 1/2 inches of bituminous.							
	3.0 894.4		LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)							
5	5.0 892.4		SANDY LOAM, non-plastic, trace Gravel and bricks, dark brown and brown, moist. (Fill)							
			SANDY LOAM, plastic, trace Gravel to with Gravel, with possible Cobbles, brown and gray, moist to wet. (Fill)			10				
10	10.0 887.4		PEAT, fibrous, black to dark brown, wet. (Swamp Deposit)	CS		297				
	13.0 884.4									Note: Possible chemical odor from 14 to 25 feet.
15	▼					11				
			LOAMY SAND, fine- to coarse-grained, trace Gravel, gray, waterbearing. (Glacial Outwash)							
20						11				* Water observed at 16 feet while drilling. Boring immediately backfilled with bentonite grout.
25	25.0 872.4		Bottom of Hole - 25 feet. *							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

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UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-19**	**897.3** *(Surveyed)*

Location: Co. Coordinate: X=502991 Y=153418 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 2

Drilling Completed **8/3/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.1 896.2		13 1/2 inches of bituminous.							
	2.5 894.8		LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)							
5			SANDY LOAM, slightly plastic, trace Gravel to with Gravel, dark brown and brown, moist. (Fill)							
	8.0 889.3					19				
10			CLAY, trace Gravel, dark brown and gray, wet. (Fill)							
	12.0 885.3			CS		264				
15			PEAT, fibrous, dark brown, wet. (Swamp Deposit)			273				
	17.0 880.3									
20			SILTY CLAY LOAM, slightly organic, with shells, dark gray, wet. (Swamp Deposit)			39				OC=5%
	21.0 876.3		SILT, slightly organic, gray, wet. (Swamp Deposit/Alluvium)			30				OC=2%
	23.0 874.3									
25			CLAY, trace fibers, gray to light gray, wet. (Alluvium)			40				LL=40, PL=22, PI=18

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS — *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-19**	**897.3** *(Surveyed)*

DEPTH / Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC	MC (%) RQD	COH (psf) ACL	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
		CLAY, trace fibers, gray to light gray, wet. (Alluvium) *(continued)*							
28.0 / 869.3		LOAM, trace Gravel, gray, wet. (Glacial Till)			19				
▼30 / 30.0 / 867.3			CS						Note: Strong chemical odor from 30 to 37 feet.
35		LOAMY SAND, fine- to coarse-grained, with Gravel and Cobbles, gray to black, waterbearing. (Glacial Outwash)							
37.0 / 860.3		Bottom of Hole - 37 feet.							

Water observed at 30 feet while drilling.

Boring immediately backfilled with bentonite grout.

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-20	893.6 (Surveyed)

Location: Co. Coordinate: X=503001 Y=153467 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/1/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	0.0		SANDY LOAM, plastic, trace Gravel and wood, slightly organic, black and dark brown, wet. (Fill)			25				OC=5%
5	7.0 886.6		LOAM, organic to highly organic, trace Gravel, brick, fibers, with occasional Peat seams, black, wet. (Fill)			55				OC=12%
10	10.0 883.6		PEAT, fibrous, dark brown, wet. (Swamp Deposit)			292				
	13.0 880.6		SILT LOAM, slightly organic, trace shells, dark brown and black, wet. (Swamp Deposit)	CS		30				OC=3%
15	15.0 878.6		SILT, white, wet. (Swamp Deposit/Marl)			43				Note: Possible chemical odor at 15 feet. LL=43, PL=32, PI=11
	17.0 876.6		CLAY, slightly organic, with Silt lenses, gray, wet. (Swamp Deposit/Alluvium)			39				OC=2% LL=38, PL=24, PI=14
▼20	18.5 875.1		SILT LOAM, gray, wet to waterbearing. (Alluvium)			26				
	21.0 872.6		SAND, fine- to coarse-grained, trace Gravel to with Gravel, gray and brown, waterbearing. (Glacial Outwash)							
25										

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-20**	**893.6** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
30	31.0 862.6		SAND, fine- to coarse-grained, trace Gravel to with Gravel, gray and brown, waterbearing. (Glacial Outwash) *(continued)* Bottom of Hole - 31 feet. Water observed at 20 feet while drilling. Boring immediately backfilled with bentonite grout.	CS						

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

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UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-21	891.6 (Surveyed)

Location: Co. Coordinate: X=503095 Y=153333 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 7/31/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 (%)	MC (%)	COH (psf)	γ (pcf)	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.0 / 890.6		CLAY, with Gravel and roots, dark brown, moist to wet. (Topsoil Fill)							
	3.0 / 888.6		SANDY LOAM, non-plastic, possible cinders, dark brown and black, moist. (Fill)							
	4.0 / 887.6		SANDY LOAM, slightly plastic, with roots and trace Gravel, dark brown to black, moist. (Fill)							
5						69				
10			PEAT, semi-fibrous to fibrous, black and dark brown, wet. (Swamp Deposit)	CS		207				Note: No recovery from 10 to 15 feet.
15										
20						192				OC=32%
	21.0 / 870.6		SILTY CLAY LOAM, organic, with fibers, black and gray, wet. (Swamp Deposit)			86				OC=10%
	23.0 / 868.6		CLAY, organic, black, wet. (Swamp Deposit)			75				OC=8%
25	25.0 / 866.6		SILT LOAM, highly organic to organic, gray and brown, wet. (Swamp Deposit/Alluvium)							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-21**	**891.6** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			SILT LOAM, highly organic to organic, gray and brown, wet. (Swamp Deposit/Alluvium) *(continued)*			111				OC=16%
						214				
	29.0 862.6									
30			SILT LOAM, slightly organic, gray and brown, wet. (Swamp Deposit/Alluvium)			34				
						23				OC=2%
	34.0 857.6									
35				CS						Note: Possible chemical odor at 35 feet.
			SAND, fine- to coarse-grained, trace Gravel to with Gravel, gray, waterbearing. (Glacial Outwash)							
40										Note: No sample recovery from 40 to 45 feet.
	45.0 846.6									
45			Bottom of Hole - 45 feet. Water observed at 19 feet while drilling. Boring immediately backfilled with bentonite grout.							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-23**	**893.7** *(Surveyed)*

Location: Co. Coordinate: X=503198 Y=153305 (ft.)

Latitude (North)= *Longitude (West)=*

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **7/31/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.0 892.7		SANDY LOAM, plastic, trace Gravel, dark brown, moist. (Topsoil Fill)							
5			SANDY LOAM, slightly plastic, trace Gravel to with Gravel, trace bituminous fragments, dark brown and brown, moist to waterbearing. (Fill)							Note: Possible chemical odor from 5 to 20 feet.
10	10.0 883.7		PEAT, semi-fibrous, black to dark brown, wet. (Swamp Deposit)			305				
	12.0 881.7		PEAT, partially decomposed, with shells, dark brown, wet. (Swamp Deposit)	CS		151				OC=32%
15	14.0 879.7		LOAMY SAND, fine- to coarse-grained, trace Gravel to with Gravel, black, waterbearing. (Glacial Outwash)							
20	20.0 873.7		SAND, fine- to coarse-grained, with Gravel, brown, waterbearing. (Glacial Outwash)							* Water observed at 4 feet while drilling. Water observed at 13 feet while drilling. Boring immediately backfilled with bentonite grout.
25	25.0 868.7		Bottom of Hole - 25 feet. *							

Index Sheet Code 3.0

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-25	897.2 (Surveyed)

Location: Co. Coordinate: X=503285 Y=153477 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/14/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 (%) REC	MC (%) RQD	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.3 895.9		15 inches of bituminous.							
5			LOAMY SAND, fine- to coarse-grained, trace Gravel to with Gravel, brown and dark brown, moist. (Fill)							Note: Possible chemical odor from 5 to 15 feet.
10	10.0 887.2			CS						
15			SAND, fine- to coarse-grained, trace Gravel, with possible Cobbles, gray and brown, then black below 15 feet, moist to waterbearing. (Fill)							Note: Strong chemical odor from 15 to 20 feet.
20	22.0 875.2		PEAT, fibrous, dark brown, wet. (Swamp Deposit)			336				
	23.0 874.2		SILT, highly organic, with shells, gray, wet. (Swamp Deposit)			133				OC=20%
	24.0 873.2									
25			SILT LOAM, highly organic, trace shells and organic fibers, dark brown, wet. (Swamp Deposit)			108				OC=18%

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-25**	**897.2** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC	MC (%) RQD	COH (psf) ACL	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	27.0 870.2		SILT LOAM, highly organic, trace shells and organic fibers, dark brown, wet. (Swamp Deposit) *(continued)*			78				
			SILT, slightly organic, gray and brown, wet. (Swamp Deposit)	CS		75				OC=5% LL=67, PL=48, PI=19
	29.5 867.7		CLAY, organic, black, wet. (Swamp Deposit)			156				
30	30.0 867.2		SILT LOAM, slightly organic, trace Gravel, gray, wet to waterbearing. (Swamp Deposit/Alluvium)			28				OC=2% LL=34, PL=25, PI=9
	32.0 865.2		Bottom of Hole - 32 feet. Refusal at 32 feet on apparent Gravel. Water observed at 14 feet while drilling. Boring immediately backfilled with bentonite grout.							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-26	897.3 (Surveyed)

Location: Co. Coordinate: X=503383 Y=153496 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/14/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.4 895.9		14 1/2 inches of bituminous.							
	3.0 894.3		LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)							
5			SANDY LOAM, slightly plastic, trace Gravel, brown, gray and dark brown, moist. (Fill)							
	7.5 889.8		CLAY, dark brown and gray, wet. (Fill)							
	8.0 889.3		LOAMY SAND, fine- to coarse-grained, with Gravel, brown, moist. (Fill)							
	9.5 887.8		CLAY, trace fibers, black and gray, wet. (Fill)							
10	10.5 886.8									
				CS						
▼15										Note: Possible chemical odor from 15 to 25 feet.
			LOAMY SAND, fine- to coarse-grained, trace Gravel to with Gravel, brown to gray, moist to waterbearing. (Fill) With occasional dark brown Clay seams from 19 to 26 feet.							
20										
						18				LL=30, PL=17, PI=13
25	26.0									

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-26**	**897.3** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC	MC (%) RQD	COH (psf) ACL	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	871.3		PEAT, fibrous, dark brown, wet. (Swamp Deposit)			237				
	28.0					235				
	869.3		PEAT, partially decomposed, with shells and fibers, black to gray, wet. (Swamp Deposit)			118				OC=25%
	29.0			CS						
	868.3					97				OC=18%
30			SILT, highly organic, trace shells, fibers and Gravel, dark brown, wet. (Swamp Deposit)							
						95				OC=15% LL=111, PL=68, PI=43
	32.0									
	865.3		Bottom of Hole - 32 feet. Refusal at 32 feet on obstruction. Water observed at 15 feet while drilling Boring immediately backfilled with bentonite grout.							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-27**	**899.0** *(Surveyed)*

Location: Co. Coordinate: X=503692 Y=153558 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **8/2/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			24 inches of bituminous.							
	2.0 897.0		LOAMY SAND, fine- to coarse-grained, with bituminous fragments and trace Gravel, brown, moist. (Fill)							
	4.0 895.0		LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)							
5	6.0 893.0		SANDY LOAM, slightly plastic, trace Gravel, dark brown and black, moist. (Fill)	CS						
10										
15										
20	20.0 879.0		PEAT, semi decomposed, with concrete fragments, black and dark brown, moist to wet. (Fill)			118				Note: Offset 10 feet and redrilled. Met refusal at 25 feet at offset location. OC=26%
	23.0 876.0		Refusal at 23 feet. Water not observed while drilling.							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-29	899.2 (Surveyed)

Location: Co. Coordinate: X=503775 Y=153575 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/2/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			24 inches of bituminous.							
	2.0 / 897.2		SAND, fine- to coarse-grained, brown, moist. (Fill)							
	3.0 / 896.2		SANDY LOAM, non-plastic, with Gravel, dark brown and brown, moist. (Fill)							
5										
	9.0 / 890.2		LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)	CS		5				P200=10% See attached Grain Size Accumulation Curve.
10										
15										
20										
	22.0 / 877.2		SILT LOAM, organic, dark brown to gray, wet. (Swamp Deposit)			45				
	23.5 / 875.7		CLAY, slightly organic, gray, wet. (Swamp Deposit/Alluvium)			35				OC=3% LL=50, PL=19, PI=31
25	25.0 / 874.2		SILT LOAM, slightly organic, trace fibers, gray, wet. (Swamp Deposit/Alluvium)							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-29**	**899.2** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			SILT LOAM, slightly organic, trace fibers, gray, wet. (Swamp Deposit/Alluvium) *(continued)*			25				OC=2% LL=32, PL=23, PI=9
▼	28.0 871.2									
30			SAND, fine- to coarse-grained, trace Gravel, brown, waterbearing. (Glacial Outwash)	CS						
35	35.0 864.2		Bottom of Hole - 35 feet. Water observed at 28 feet while drilling. Boring immediately backfilled with bentonite grout.							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-30	895.8 (Surveyed)

Location: Co. Coordinate: X=503813 Y=153486 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/1/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.0 894.8		SANDY LOAM, non-plastic, dark brown, moist. (Topsoil Fill)							
			LOAMY SAND, fine-to coarse-grained, trace Gravel, with occasional Sandy Loam seams, black and dark brown, moist. (Fill)							
5	5.0 890.8		SANDY LOAM, non-plastic, trace Gravel, dark brown and brown, moist. (Fill)							
	8.0 887.8									
10			SAND, fine- to coarse-grained, with Gravel, brown, moist to waterbearing. (Fill)	CS		6				P200=6% See attached Grain Size Accumulation Curve.
▼15	15.0 880.8					13				P200=6% See attached Grain Size Accumulation Curve.
			SAND, fine- to coarse-grained, trace Gravel, brown, waterbearing. (Fill)							
	19.5 876.3		PEAT, fibrous, dark brown, wet. (Swamp Deposit)							
20	20.0 875.8		SILT LOAM, highly organic, with shells, dark brown, wet. (Swamp Deposit)			83				OC=12%
	22.5 873.3		SILT LOAM, slightly organic, brown and green, waterbearing. (Swamp Deposit)			114				OC=2%
25	25.0 870.8		SILT, organic, with Clay lenses, brown, wet. (Swamp Deposit)							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-30**	**895.8** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	27.0 868.8		SILT, organic, with Clay lenses, brown, wet. (Swamp Deposit) *(continued)*			76				
			CLAY, slightly organic, gray to black, wet. (Swamp Deposit)			35				OC=2% LL=40, PL=22, PI=18
30	30.5 865.3		LOAMY SAND, fine- to coarse-grained, trace Gravel, with occasional Peat and Clay seams, gray and dark brown, waterbearing. (Swamp Deposit/Alluvium)							
35	35.0 860.8		SILT LOAM, slightly organic, gray and black, wet to waterbearing. (Alluvium/Swamp Deposit)	CS		31				OC=2% LL=32, PL=23, PI=9
40	39.0 856.8		SANDY LOAM, slightly plastic, trace Gravel, gray, wet. (Glacial Till)			15				
	42.0 853.8		LOAMY SAND, fine- to coarse-grained, trace Gravel, gray, waterbearing. (Glacial Outwash)							
45	45.0 850.8		Bottom of Hole - 45 feet.							

Water observed at 15 feet while drilling.
Water observed at 22 1/2 feet while drilling.
Boring immediately backfilled with bentonite grout.

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-34**	**900.3** *(Surveyed)*

Location: Co. Coordinate: X=503972 Y=153613 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **8/2/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC	MC (%) RQD	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			24 inches of bituminous.	CS						
	2.0 / 898.3		LOAMY SAND, fine- to medium-grained, with Gravel, dark brown, moist. (Fill)							Note: Possible chemical odor at 2 feet.
	4.0 / 896.3		LOAMY SAND, fine- to coarse-grained, with Gravel, dark brown, dry. (Fill)							
5	7.5 / 892.8		SANDY LOAM, with Gravel, slightly plastic, dark brown, moist. (Fill)							
	9.0 / 891.3		CLAY, slightly organic, with Gravel and concrete fragments, black, moist to wet. (Fill)							
10	10.0 / 890.3		CLAY, with concrete fragments, gray, moist to wet. (Fill)							
	12.0 / 888.3		LOAMY SAND, fine- to coarse-grained, dark brown, moist to wet. (Fill)							
	14.0 / 886.3		SAND, fine- to coarse-grained, brown, moist.							
15	15.0 / 885.3		PEAT, partially decomposed, black, wet. (Swamp Deposit)			220				
	16.5 / 883.8		CLAY, slightly organic to organic, with seams of Sand, black and gray, wet. (Swamp Deposit)			31				OC=6%
▼						20				LL=26, PL=16, PI=10 OC=2%
20	20.0 / 880.3		SAND, fine- to coarse-grained, gray, waterbearing. (Alluvium/Glacial Outwash)			16				OC=1% * Water observed at 18 feet while drilling. Boring immediately backfilled with bentonite grout.
	23.0 / 877.3		SILTY CLAY LOAM, trace Gravel, gray, wet. (Glacial Till)							
25	25.0 / 875.3		Bottom of Hole - 25 feet. *			18				LL=23, PL=17, PI=6

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**C-35**	**891.5** *(Surveyed)*

Location: Co. Coordinate: X=504044 Y=153702 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **8/1/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
			SANDY LOAM, plastic, trace Gravel and roots, dark brown, moist. (Fill)							
	4.0 887.5									
5			PEAT, semi-fibrous to fibrous, dark brown, wet. (Swamp Deposit)			184				
	7.5 884.0									
			CLAY, gray, wet. (Swamp Deposit/Alluvium)			25				OC=1% LL=33, PL=13, PI=20
10	10.0 881.5			CS						
▼										
15			SAND, fine- to coarse-grained, trace Gravel to with Gravel, brown, moist to waterbearing. (Glacial Outwash)							
20	20.0 871.5									

Bottom of Hole - 20 feet.
Water observed at 12 feet while drilling.
Boring immediately backfilled with bentonite grout.

MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	C-36	900.9 (Surveyed)

Location: Co. Coordinate: X=504070 Y=153633 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 1

Drilling Completed: 8/2/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.5 899.4		18 inches of bituminous.							
			No sample.							Note: No sample recovery from 0 to 5 feet.
5	5.0 895.9		SANDY LOAM, non- plastic, with Gravel, brown and dark brown, moist. (Fill)							
	8.0 892.9		LOAMY SAND, fine- to coarse-grained, trace Gravel to with Gravel, brown, moist. (Fill)							
10	10.0 890.9		SANDY LOAM, slightly plastic, with Gravel, black and brown, moist to wet. (Fill)							
	12.0 888.9		CLAY, slightly organic, trace Gravel, black, wet. (Fill/Swamp Deposit)	CS		23				OC=3% LL=34, PL=18, PI=16
15	15.0 885.9		PEAT, semi-fibrous, dark brown, wet. (Swamp Deposit)			109				
▼	19.0 881.9		LOAMY SAND, fine- to coarse-grained, trace Gravel to with Gravel, gray, waterbearing. (Glacial Outwash)							
20	22.0 878.9		SAND, fine- to coarse-grained, trace Gravel, brown, waterbearing. (Glacial Outwash)							* Water observed at 17 1/2 feet while drilling. Boring immediately backfilled with bentonite grout.
25	25.0 875.9		Bottom of Hole - 25 feet. *							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**X-1**	**892.7** *(Surveyed)*

Location: Co. Coordinate: X=502708 Y=153190 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **7/30/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} (%) REC	MC (%) RQD	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	0.5 892.2		SANDY LOAM, plastic, black, moist. (Topsoil Fill)							
			SANDY LOAM, slightly plastic, trace Gravel, roots and bituminous fragments, dark brown, moist. (Fill)			16				
	3.5 889.2		CLAY, slightly organic, trace fibers and Gravel, black and gray, wet. (Fill)			20				OC=3%
5	5.0 887.7		PEAT, semi-fibrous, black, wet. (Swamp Deposit)			140				
	8.5 884.2		CLAY, trace fibers, gray, wet. (Alluvium/Swamp Deposit)			21				
	9.5 883.2			CS						
10										
▼										
15			SAND, fine- to coarse-grained, trace Gravel to with Gravel, with occasional Loamy Sand seams, brown, moist to waterbearing. (Glacial Outwash)							
20	20.0 872.7		Bottom of Hole - 20 feet. Water observed at 14 feet while drilling. Boring immediately backfilled with bentonite grout.							

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**X-2**	**893.5** *(Surveyed)*

Location: Co. Coordinate: X=502868 Y=153195 (ft.)

Latitude (North)= *Longitude (West)=*

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 1

Drilling Completed **7/30/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	0.5 893.0		SANDY LOAM, slightly plastic, dark brown, moist. (Topsoil Fill)							
			SANDY LOAM, non-plastic, with Gravel and trace cinders, brown and dark brown, moist. (Fill)							
5	6.0 887.5		PEAT, semi-fibrous, dark brown, wet. (Swamp Deposit)			80				
	8.0 885.5		CLAY, trace fibers, organic, black, wet. (Swamp Deposit)							
	9.0 884.5		LOAM, trace Gravel, brown and gray, wet. (Alluvium/Glacial Till)	C S		20				
10	11.0 882.5									
15			SAND, fine- to coarse-grained, with Gravel and possible Cobbles, brown, moist to waterbearing. (Alluvium)							Note: Possible chemical odor from 15 to 20 feet.
20	20.0 873.5		Bottom of Hole - 20 feet. Water observed at 13 feet while drilling. Boring immediately backfilled with bentonite grout.							

Index Sheet Code 3.0

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	X-3	895.5 (Surveyed)

Location: Co. Coordinate: X=503319 Y=153534 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine: GP-01

Hammer: GeoProbe Automatic

SHEET 1 of 2

Drilling Completed: 8/1/12

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N60 (%) REC	MC (%) RQD	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	1.0 894.5		SANDY LOAM, slightly plastic, trace Gravel, dark brown, moist. (Topsoil Fill)							
5			SANDY LOAM, non-plastic, trace Gravel and roots, with occasional Sand seams, brown and dark brown, moist. (Fill)							
10	10.0 885.5		PEAT, fibrous to semi-fibrous, dark brown, wet. (Swamp Deposit)	CS		373				Note: Possible chemical odor from 10 to 45 feet.
15						170				OC=28%
						155				OC=29%
20	20.0 875.5		SILTY CLAY LOAM, slightly organic to organic, with fibers and shells, dark brown, wet. (Swamp Deposit)			30				LL=35, PL=23, PI=12 OC=3%
25										

(Continued Next Page)

Index Sheet Code 3.0

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**X-3**	**895.5** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	27.5 868.0		SILTY CLAY LOAM, slightly organic to organic, with fibers and shells, dark brown, wet. (Swamp Deposit) *(continued)*							
30			SILTY CLAY LOAM, highly organic, trace shells, with occasional Sandy Loam seams, black, wet. (Swamp Deposit)			110				OC=16%
	31.0 864.5		CLAY, trace Gravel, gray, wet. (Glacial Till)			16				
▼	33.0 862.5									
35			SAND, fine- to coarse-grained, trace Gravel to with Gravel, gray and black, waterbearing. (Glacial Outwash)	CS						
40										
45	45.0 850.5		Bottom of Hole - 45 feet. Water observed at 33 feet while drilling. Boring immediately backfilled with bentonite grout.							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**X-4**	**894.0** *(Surveyed)*

Location: Co. Coordinate: X=503460 Y=153299 (ft.)

Latitude (North)= Longitude (West)=

No Station-Offset Information Available

Drill Machine **GP-01**

Hammer **GeoProbe Automatic**

SHEET 1 of 2

Drilling Completed **7/31/12**

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} REC (%)	MC (%) RQD (%)	COH (psf) ACL (ft)	γ (pcf) Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
	0.4 893.6		5 inches of bituminous. LOAMY SAND, fine- to coarse-grained, trace Gravel, brown, moist. (Fill)							
	1.5 892.5					16				
5			SANDY LOAM, plastic, non- to slightly organic, with Gravel and bituminous fragments, with Peat seams from 7-10 feet, dark brown and black, moist to wet. (Fill)			48				
10						22				
▼	12.0 882.0		PEAT, fibrous, dark brown, wet. (Swamp Deposit)	CS		369				
15	15.0 879.0		SILT LOAM, with shells, organic, gray, wet. (Swamp Deposit)			161				
	17.0 877.0		PEAT, with fibers and shells, brown, wet. (Swamp Deposit)			174				
20	20.0 874.0		SILT LOAM, trace shells, organic to highly organic, dark brown to gray, wet. (Swamp Deposit)			166				
						130				
25										

Index Sheet Code 3.0

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Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

LABORATORY LOG & TEST RESULTS - SUBSURFACE EXPLORATION

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

Mn/DOT GEOTECHNICAL SECTION - LOG & TEST RESULTS *SHEET 2 of 2*

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Boring No.	Ground Elevation
		TH 7 & Louisiana Ave Design	**X-4**	**894.0** *(Surveyed)*

DEPTH	Depth / Elev.	Lithology	Classification	Drilling Operation	SPT N_{60} / REC (%)	MC (%) / RQD (%)	COH (psf) / ACL (ft)	γ (pcf) / Core Breaks	Soil / Rock	Other Tests Or Remarks / Formation or Member
30			SILT LOAM, trace shells, organic to highly organic, dark brown to gray, wet. (Swamp Deposit) *(continued)*			112 175 144				OC=20%
35	35.0 859.0		PEAT, spongy, organic, brown, wet. (Swamp Deposit)	CS		292				OC=54%
40	39.0 855.0		LOAMY SAND, fine- to coarse-grained, trace Gravel, gray, waterbearing. (Glacial Outwash)							
45	42.0 852.0		SAND, fine- to coarse-grained, trace Gravel, gray to brown, waterbearing. (Glacial Outwash)							* Water observed at 12 feet while drilling. Water observed at 30 feet while drilling. Boring immediately backfilled with bentonite grout.
50	50.0 844.0		Bottom of Hole - 50 feet. *							

Soil Class:J. Van Abel Rock Class: Edit: Date: 9/27/12

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Appendix B

MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

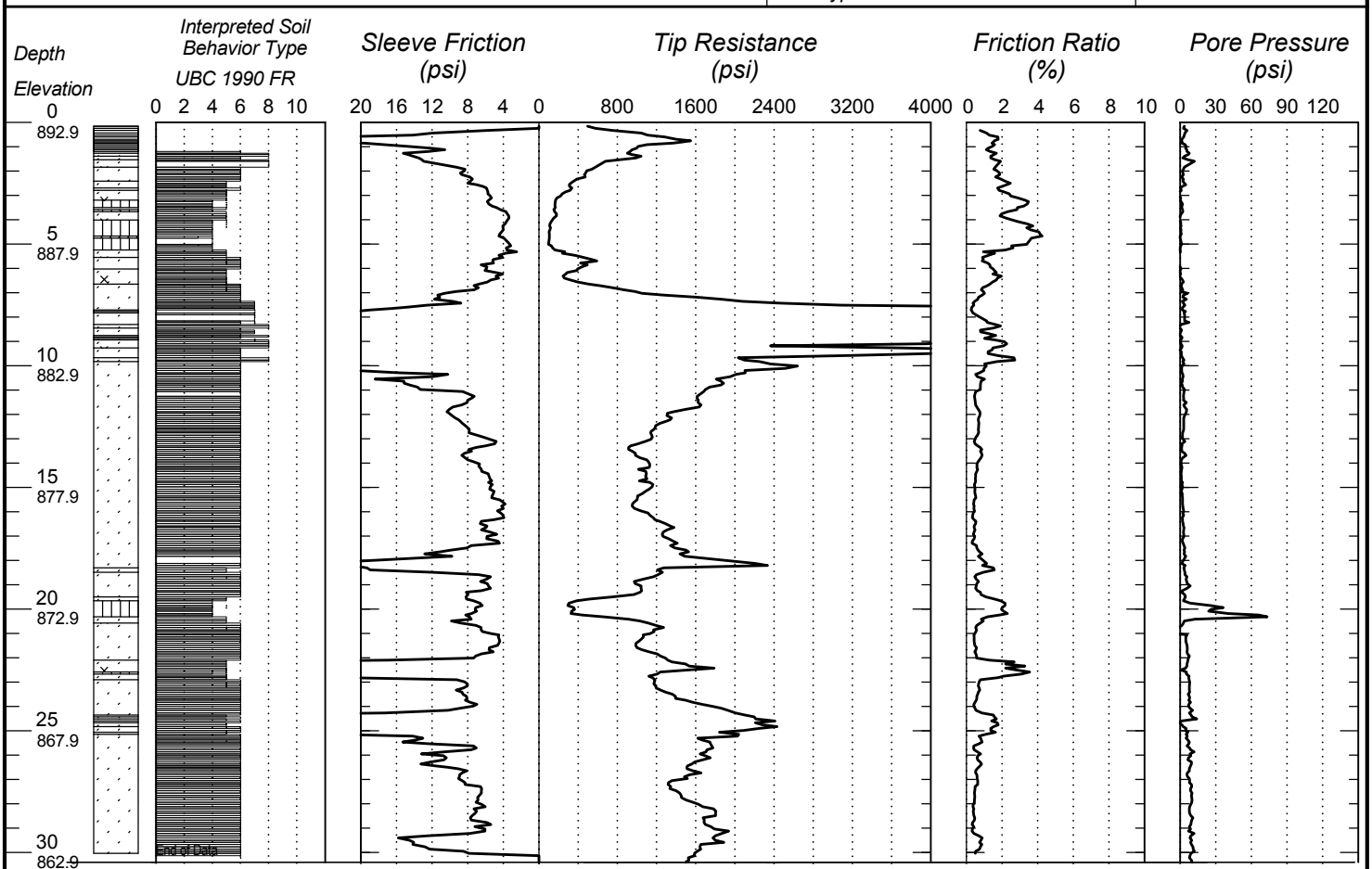
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-13**	**892.9** *(Surveyed)*

Location			
Co. Coordinate: X=502797 Y=153297 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/16/12**



Bottom of Hole 30.41

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

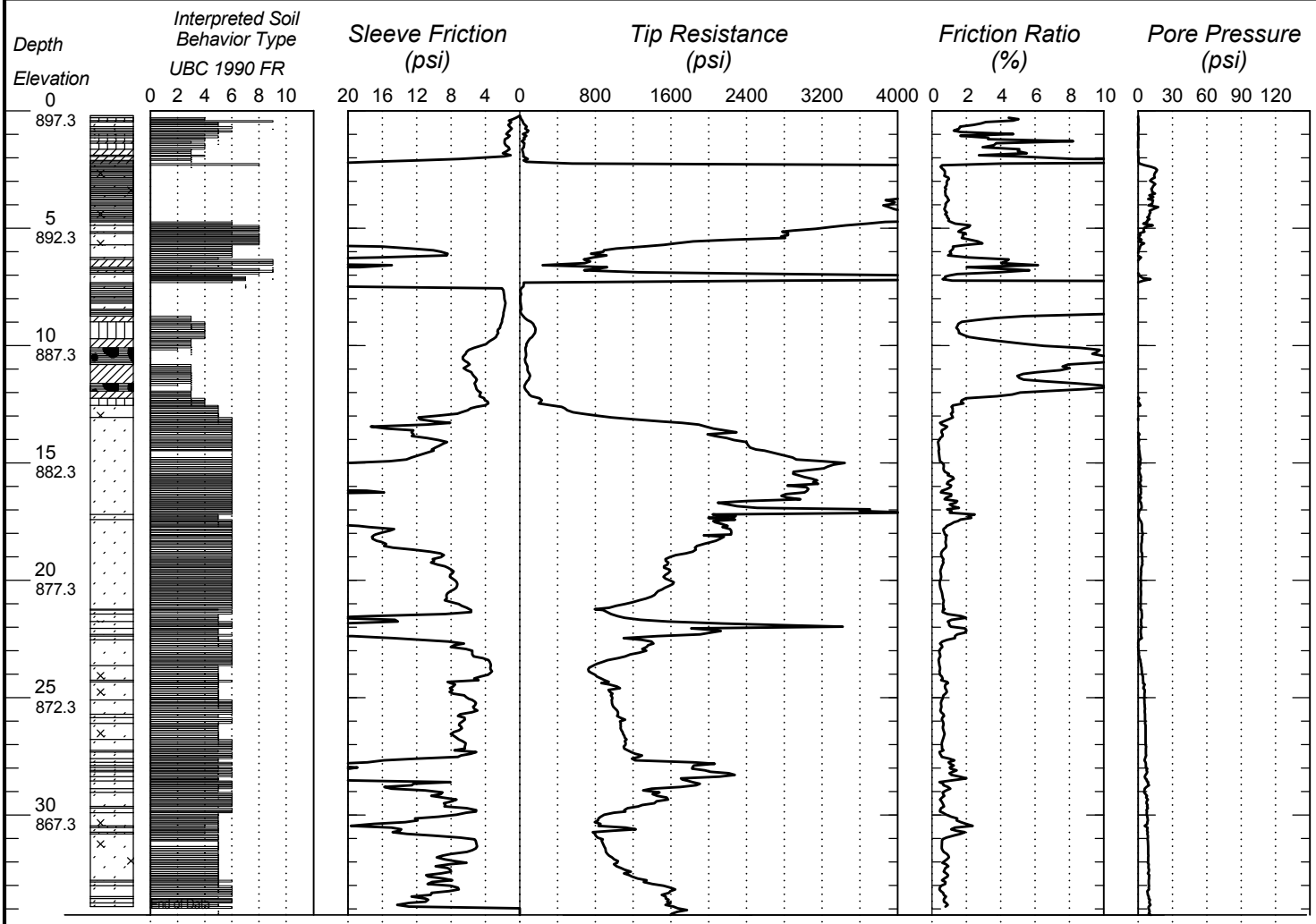
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-14**	**897.3** *(Surveyed)*

Location			
Co. Coordinate: X=502795 Y=153375 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/18/12**



Bottom of Hole 34.26

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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-15**	**895.7** *(Surveyed)*

Location			
Co. Coordinate: X=502817 Y=153419 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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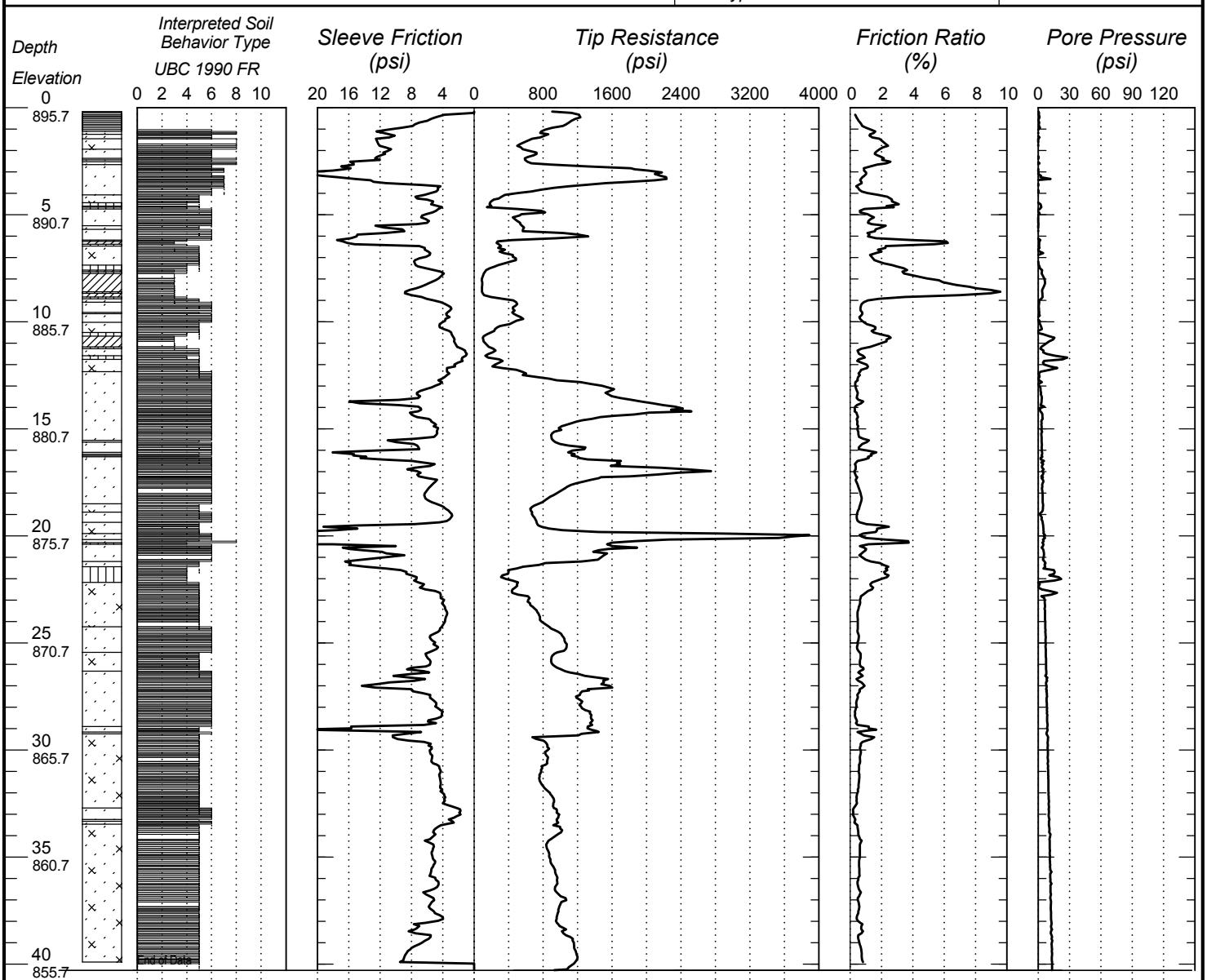
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/17/12**



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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

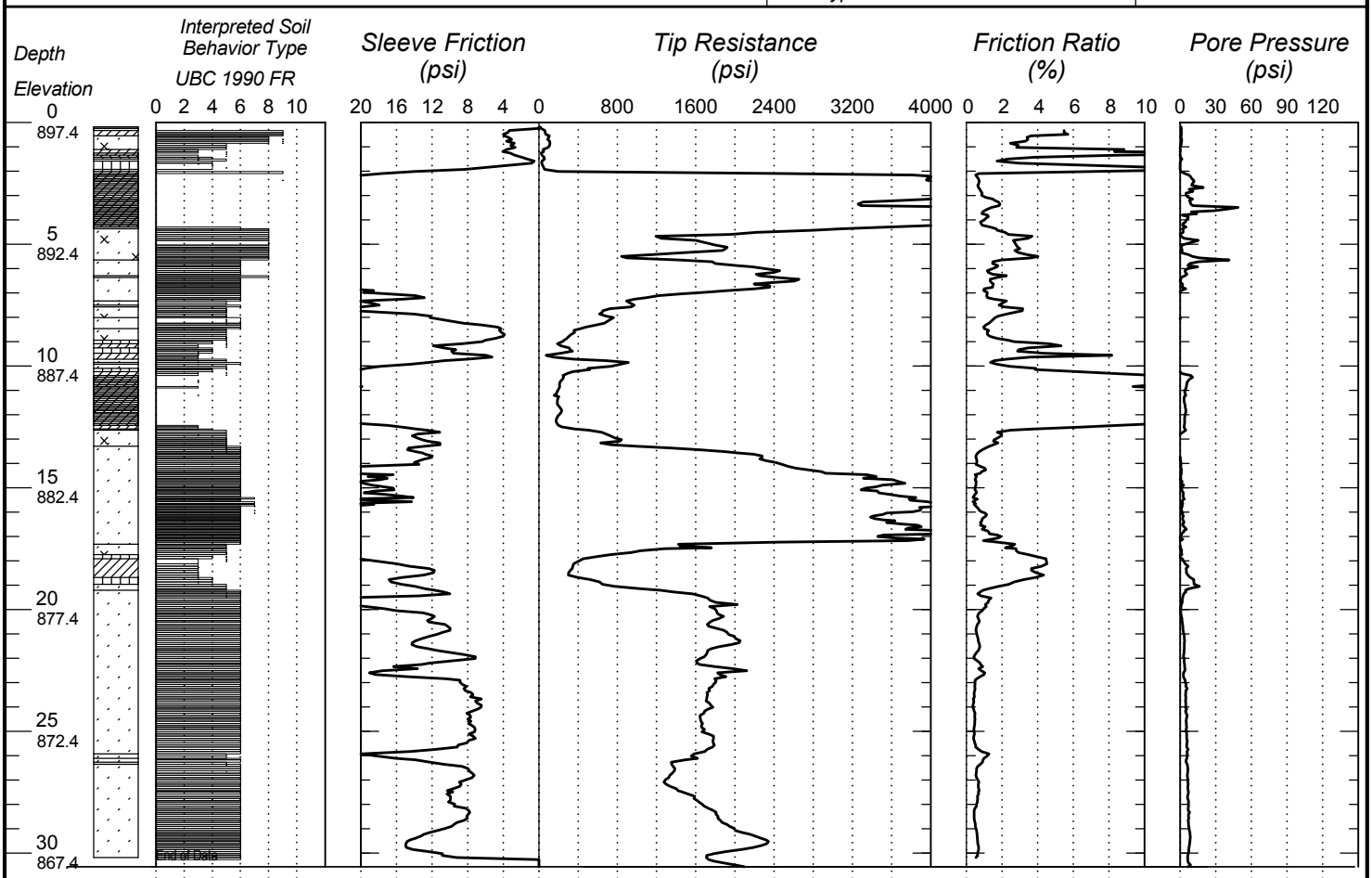
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-16**	**897.4** *(Surveyed)*

Location			
Co. Coordinate: X=502893 Y=153397 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



Bottom of Hole 30.56

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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

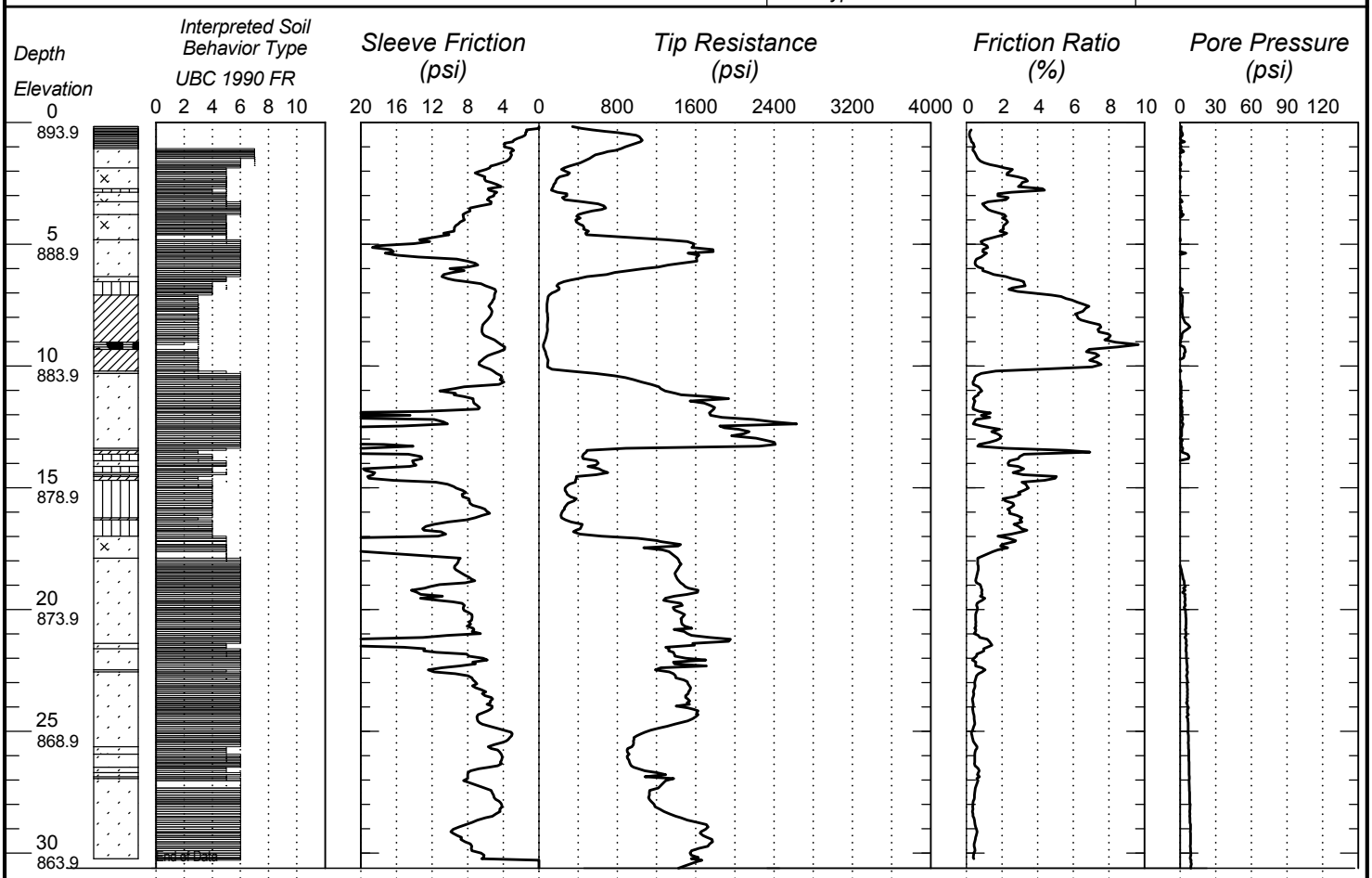
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-17**	**893.9** *(Surveyed)*

Location			
Co. Coordinate: X=502904 Y=153442 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/18/12**



Bottom of Hole 30.62

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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

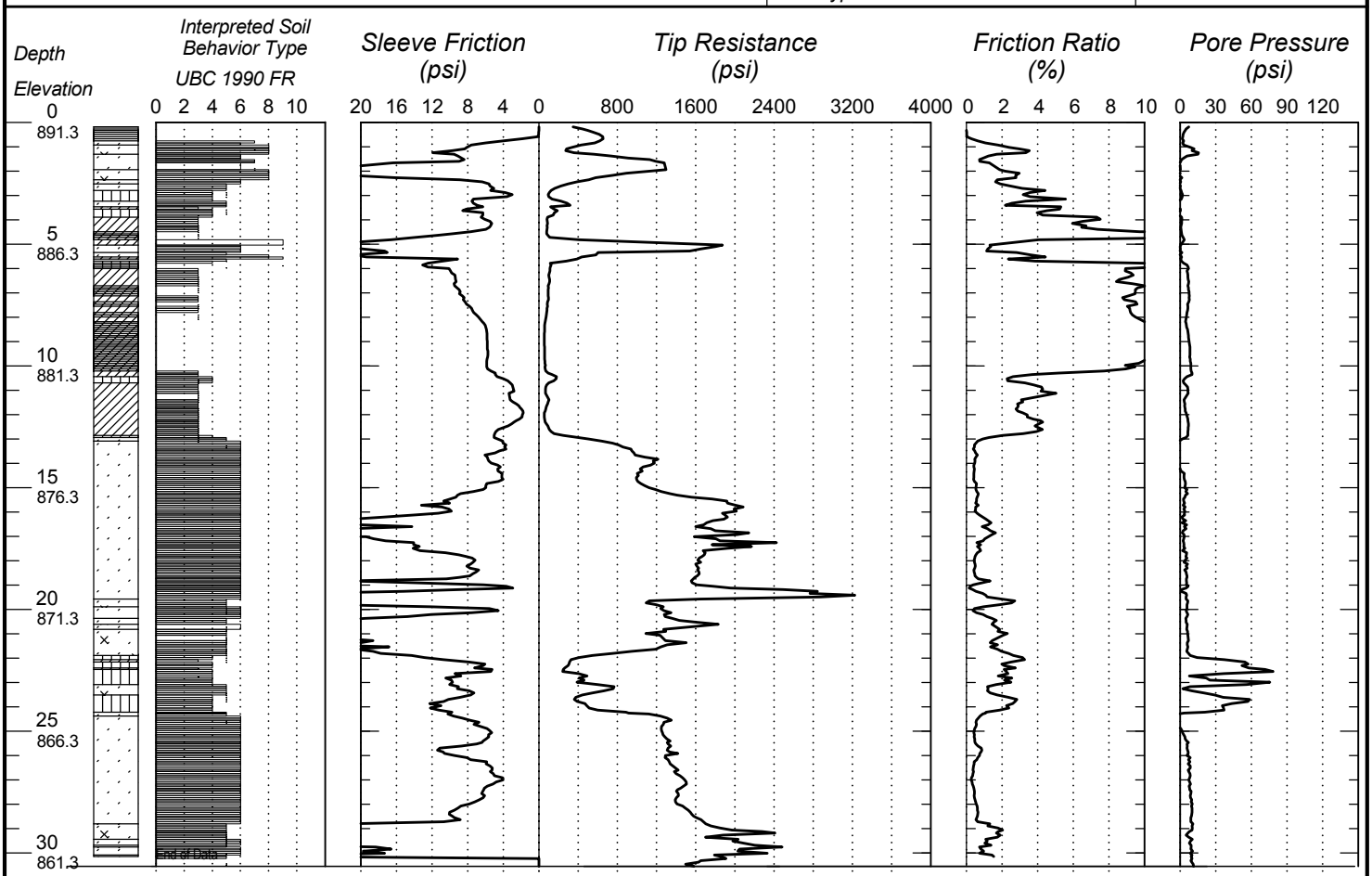
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-18**	**891.3** *(Surveyed)*

Location			
Co. Coordinate: X=502995 Y=153322 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	*CPT Operator* **Rowland**	*Date Completed*
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/16/12**



Bottom of Hole 30.55

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

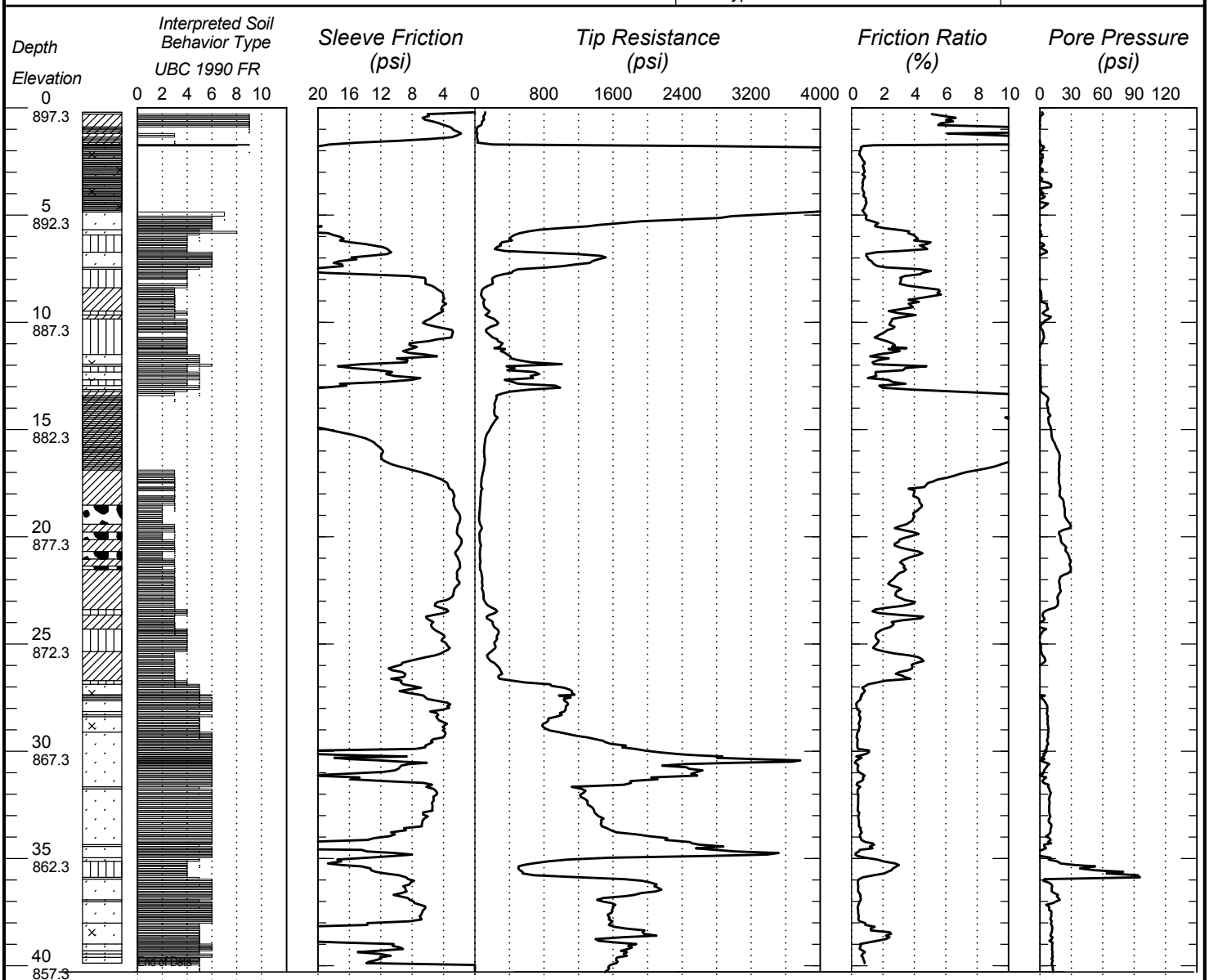
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-19**	**897.3** *(Surveyed)*

Location			
Co. Coordinate: X=502991 Y=153418 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	*CPT Operator* **Rowland**	*Date Completed*
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-20**	**893.6** *(Surveyed)*

Location			
Co. Coordinate: X=503001 Y=153467 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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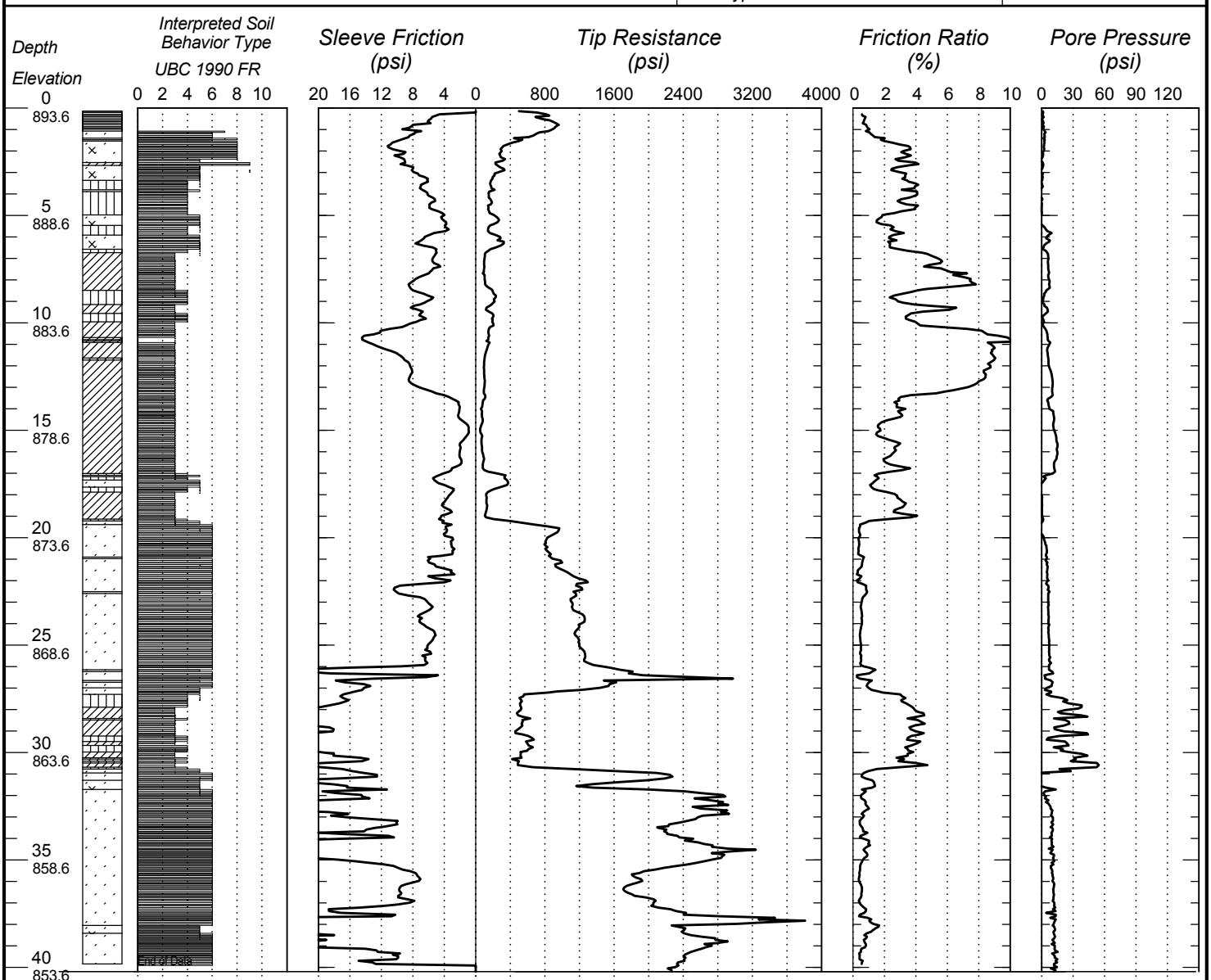
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

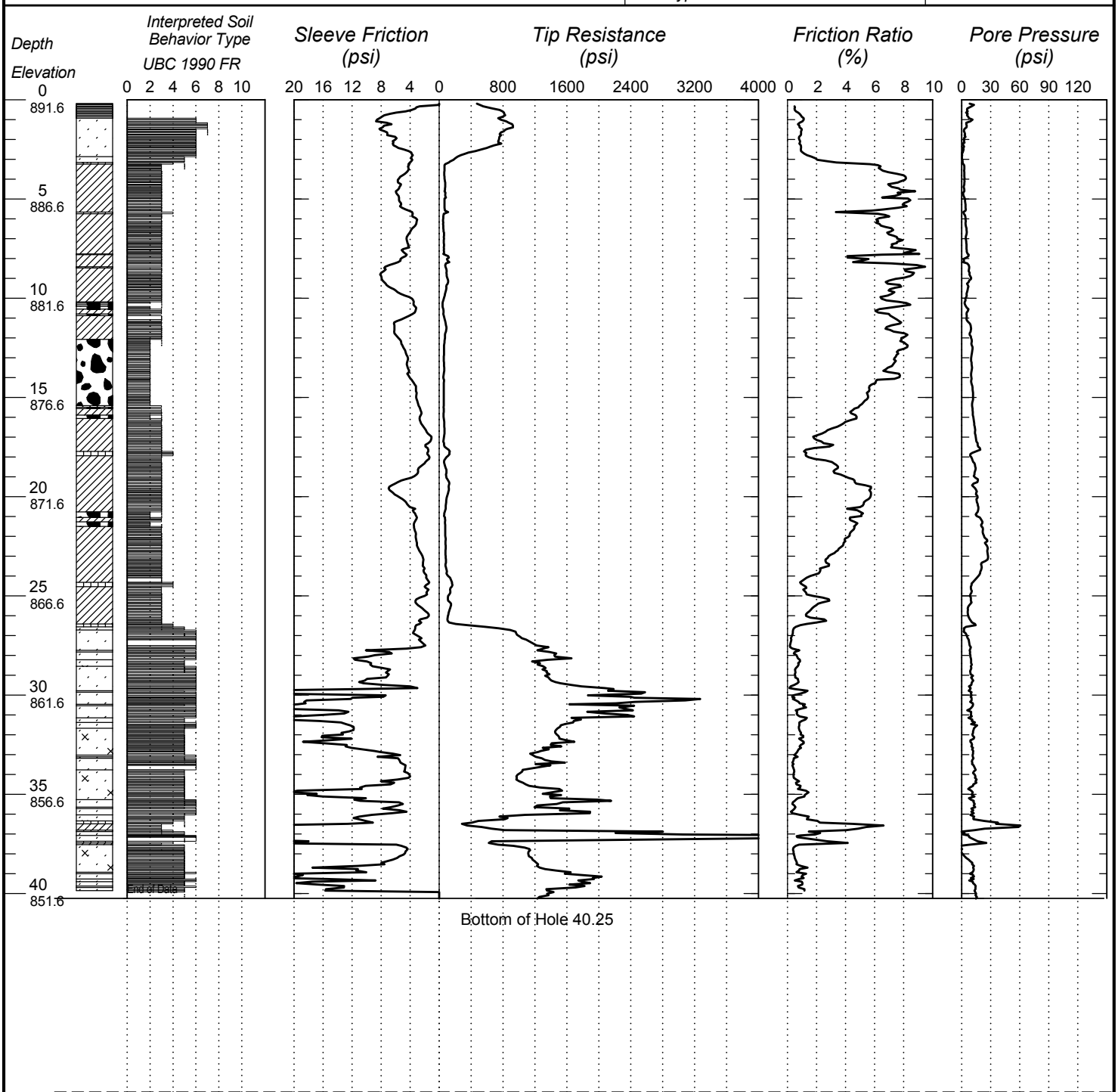
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-21**	**891.6** *(Surveyed)*

Location		CPT Machine	SHEET 1 of 1
Co. Coordinate: X=503095 Y=153333 (ft.)		**CPT-1**	
Latitude (North)= *Longitude (West)=*		CPT Operator **Rowland**	Date Completed
No Station-Offset Information Available		Hole Type **CPT-STD**	**7/16/12**



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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

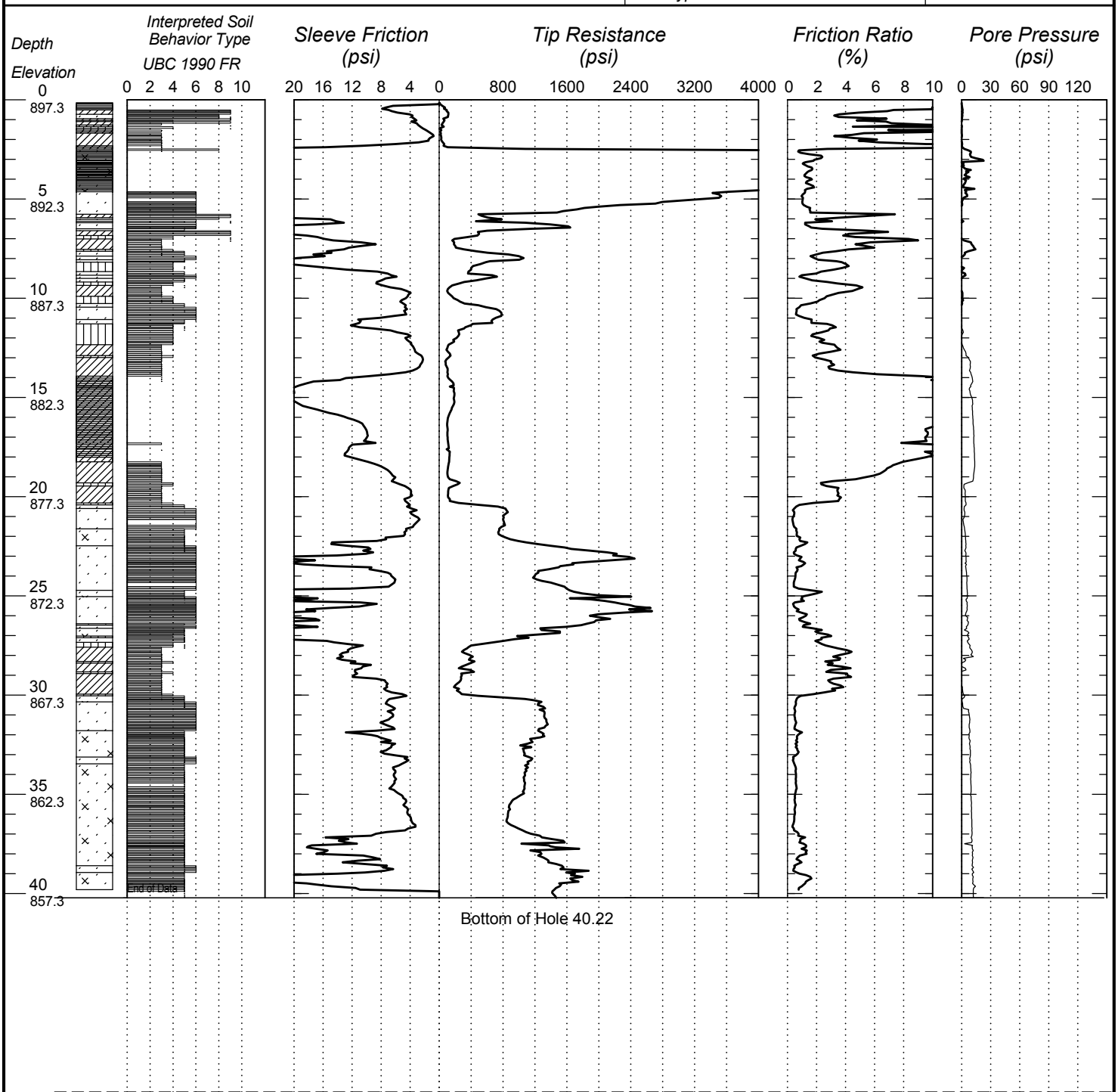
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-22**	**897.3** *(Surveyed)*

Location			
Co. Coordinate: X=503089 Y=153438 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/18/12**



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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-23**	**893.7** *(Surveyed)*

Location			
Co. Coordinate: X=503198 Y=153305 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
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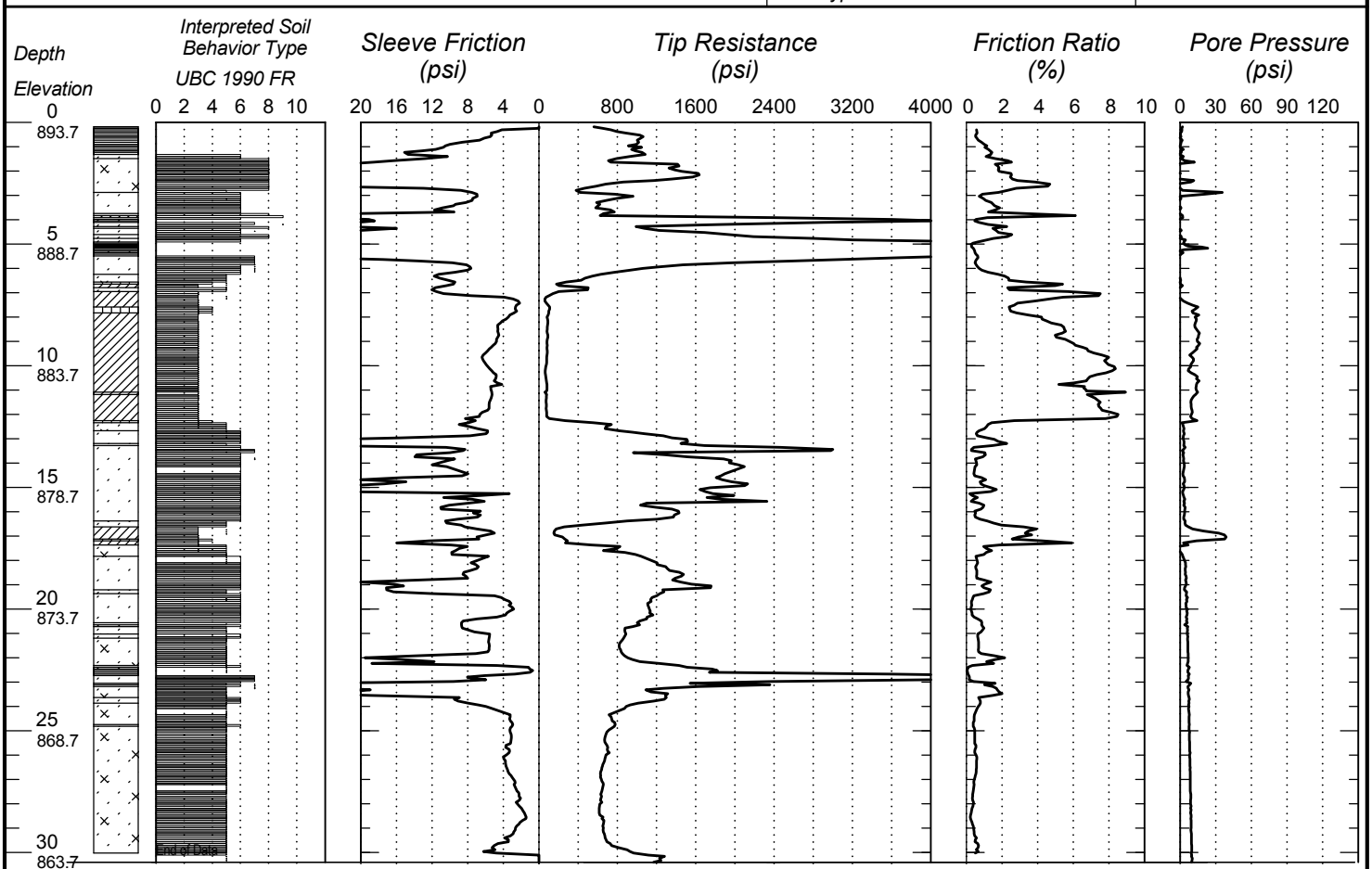
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/16/12**



Bottom of Hole 30.41

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-24**	**897.2** *(Surveyed)*

Location			
Co. Coordinate: X=503187 Y=153458 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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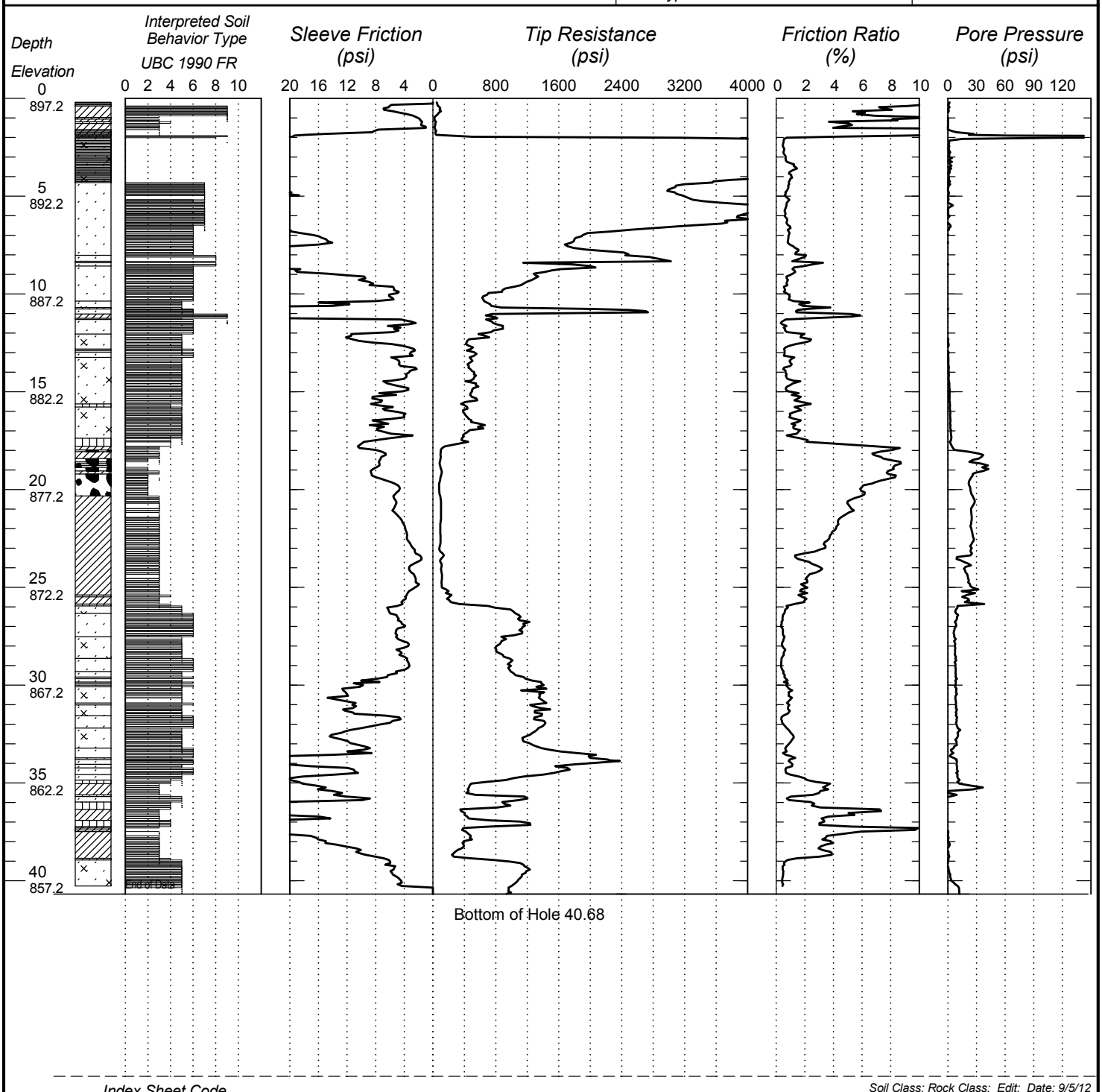
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-25**	**897.2** *(Surveyed)*

Location			
Co. Coordinate: X=503285 Y=153477 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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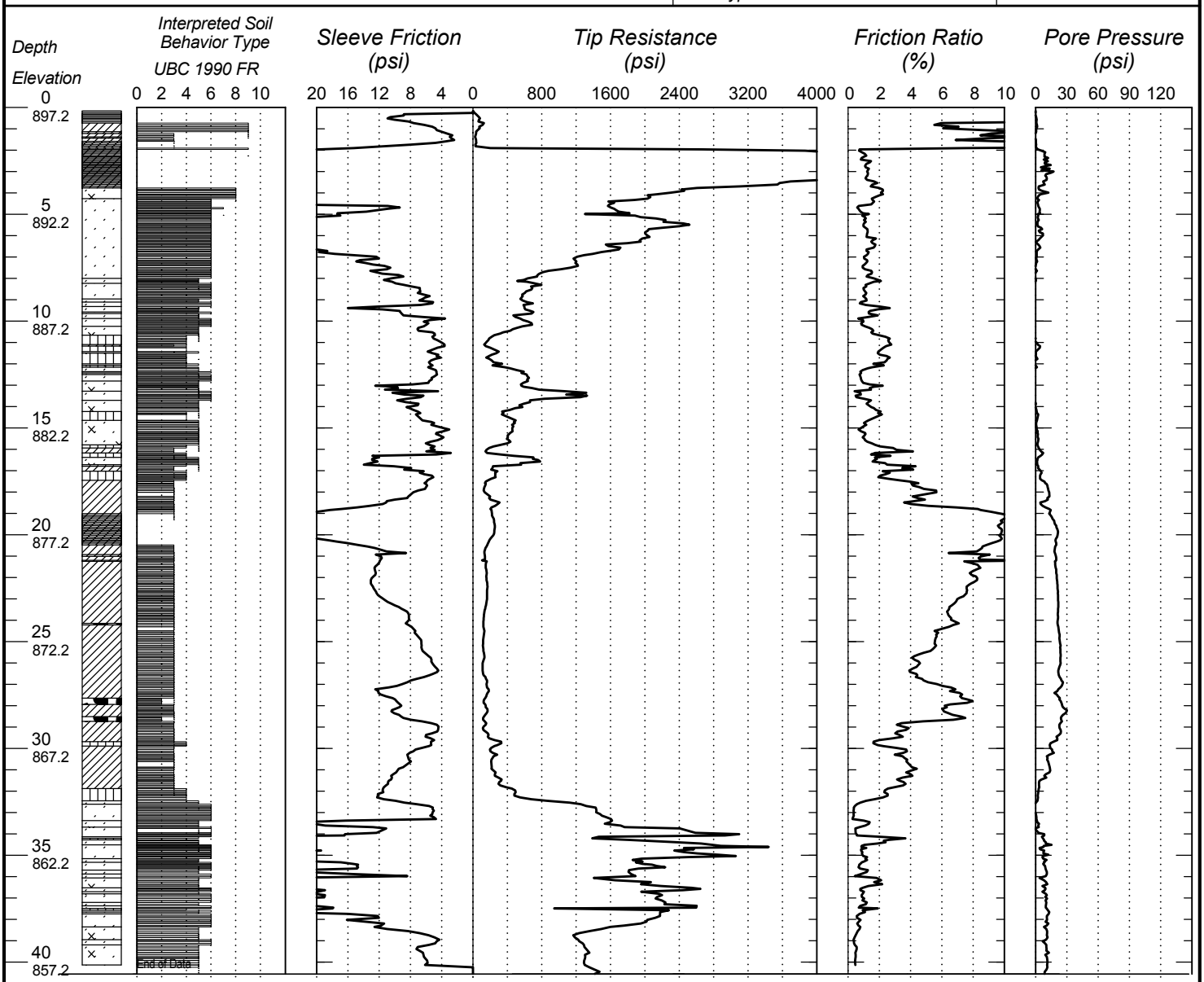
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-26**	**897.3** *(Surveyed)*

Location			
Co. Coordinate: X=503383 Y=153496 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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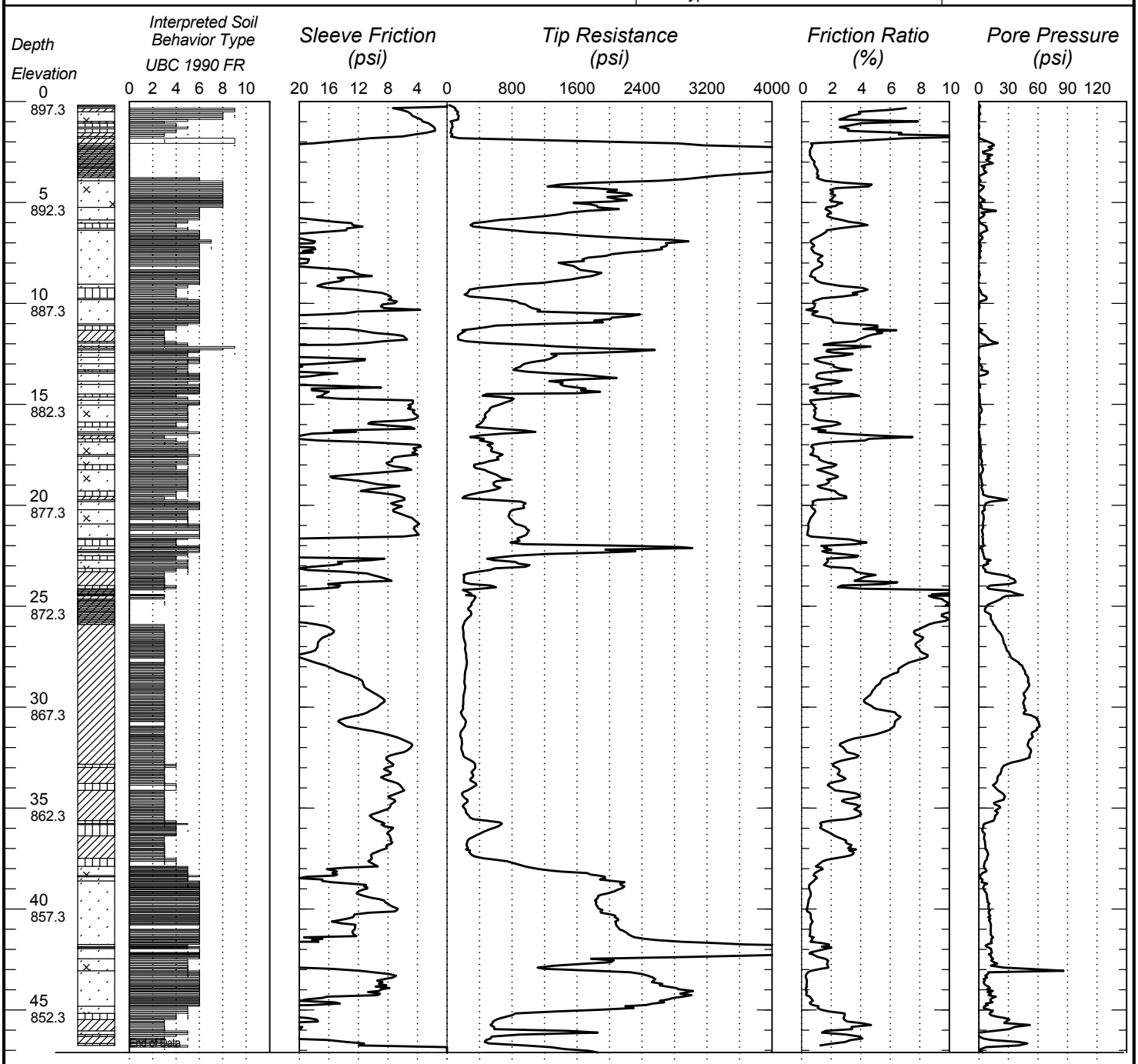
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/18/12**



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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

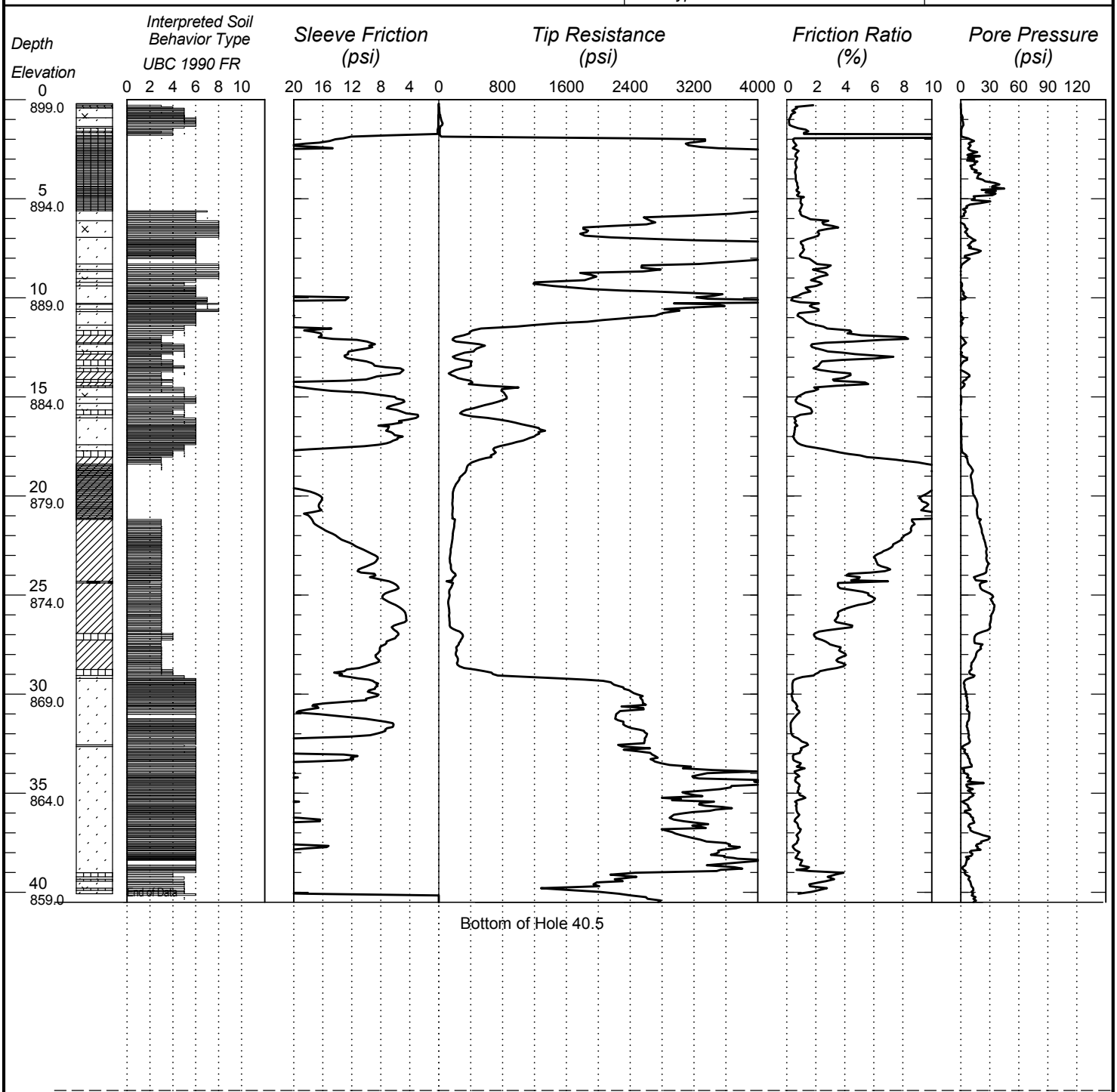
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-27**	**899.0** *(Surveyed)*

Location			
Co. Coordinate: X=503692 Y=153558 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/17/12**



Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

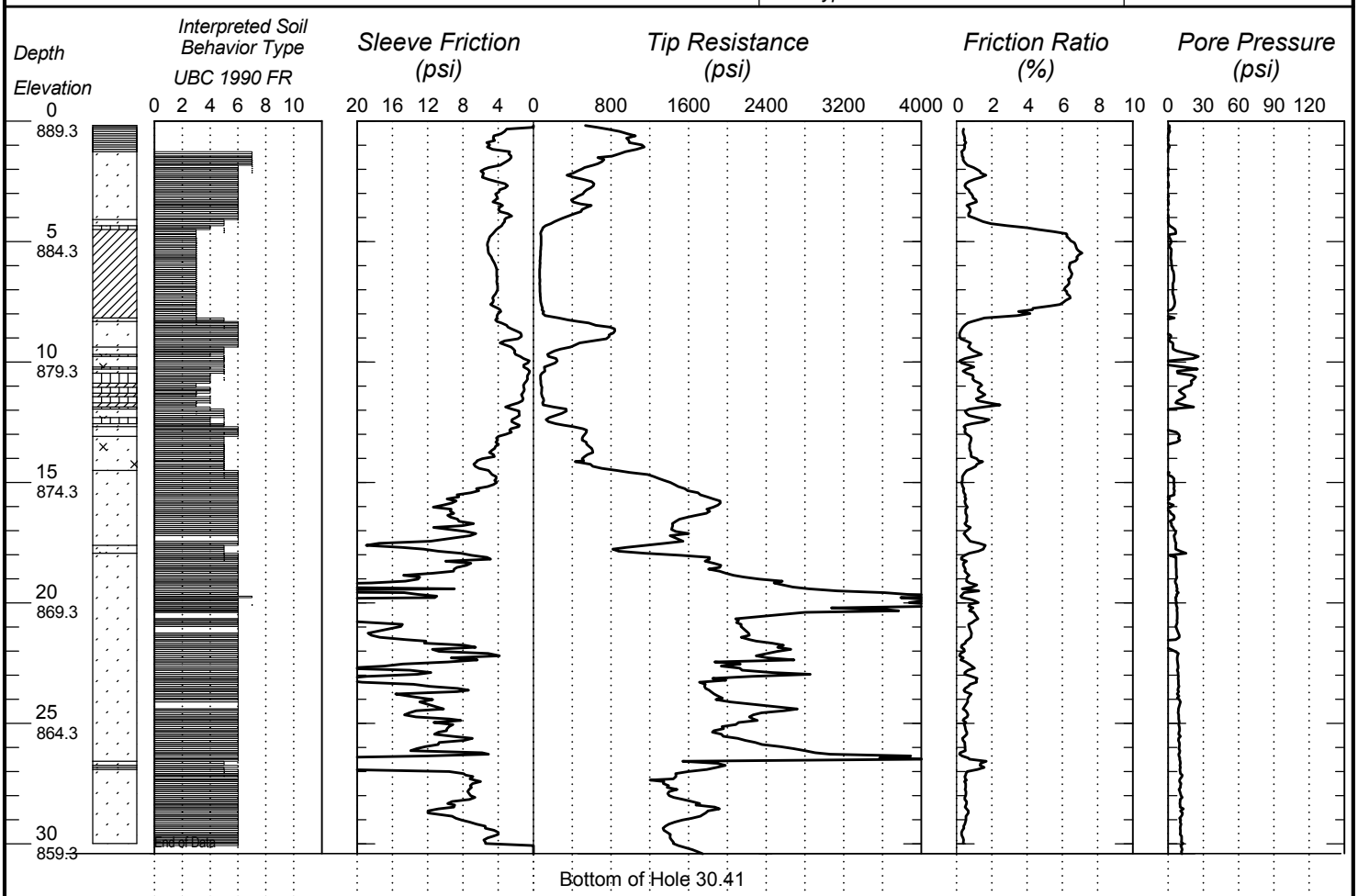
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-28**	**889.3** *(Surveyed)*

Location			
Co. Coordinate: X=503719 Y=153650 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/16/12**



Bottom of Hole 30.41

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

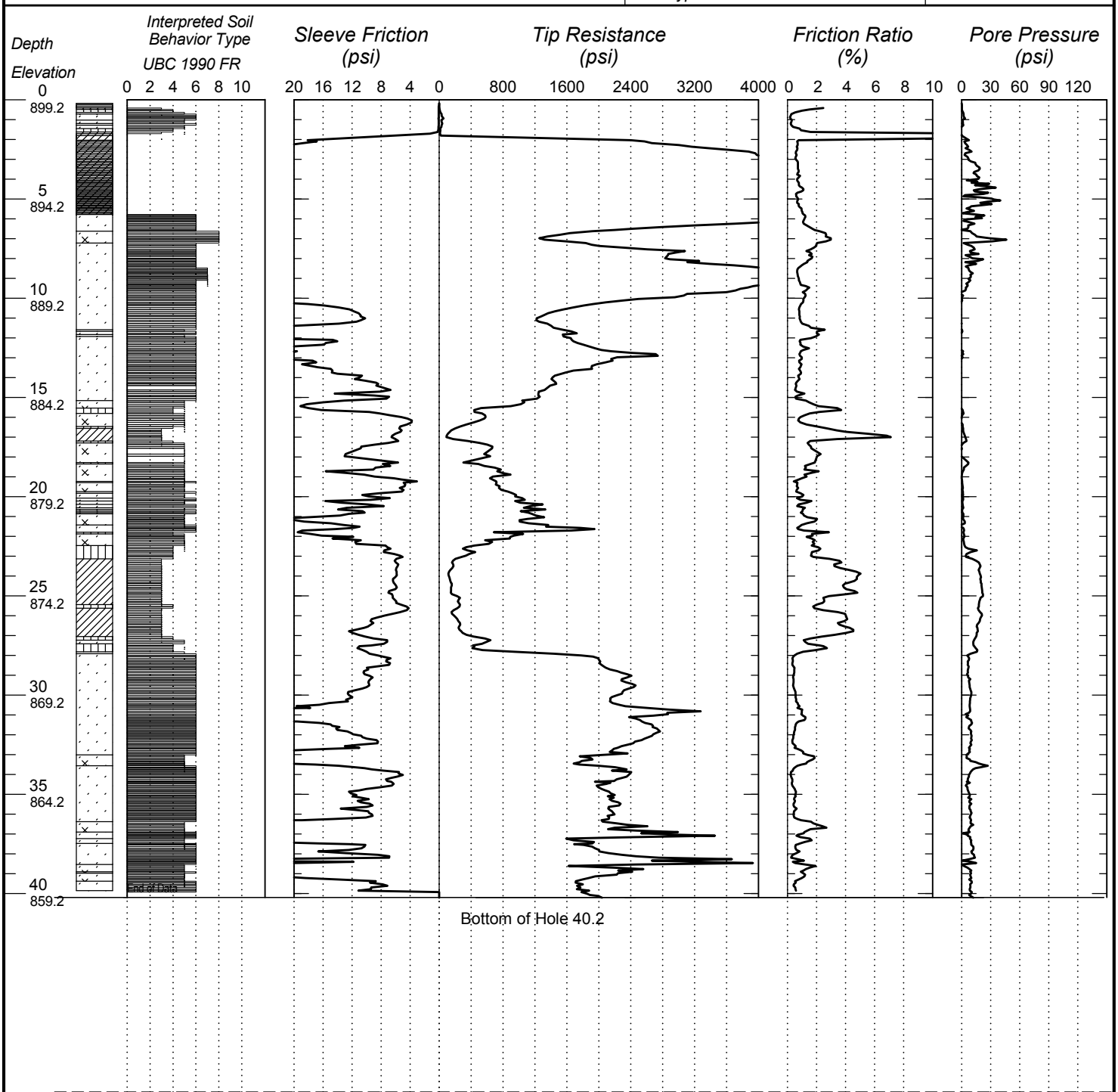
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-29**	**899.2** *(Surveyed)*

Location			
Co. Coordinate: X=503775 Y=153575 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/17/12**



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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

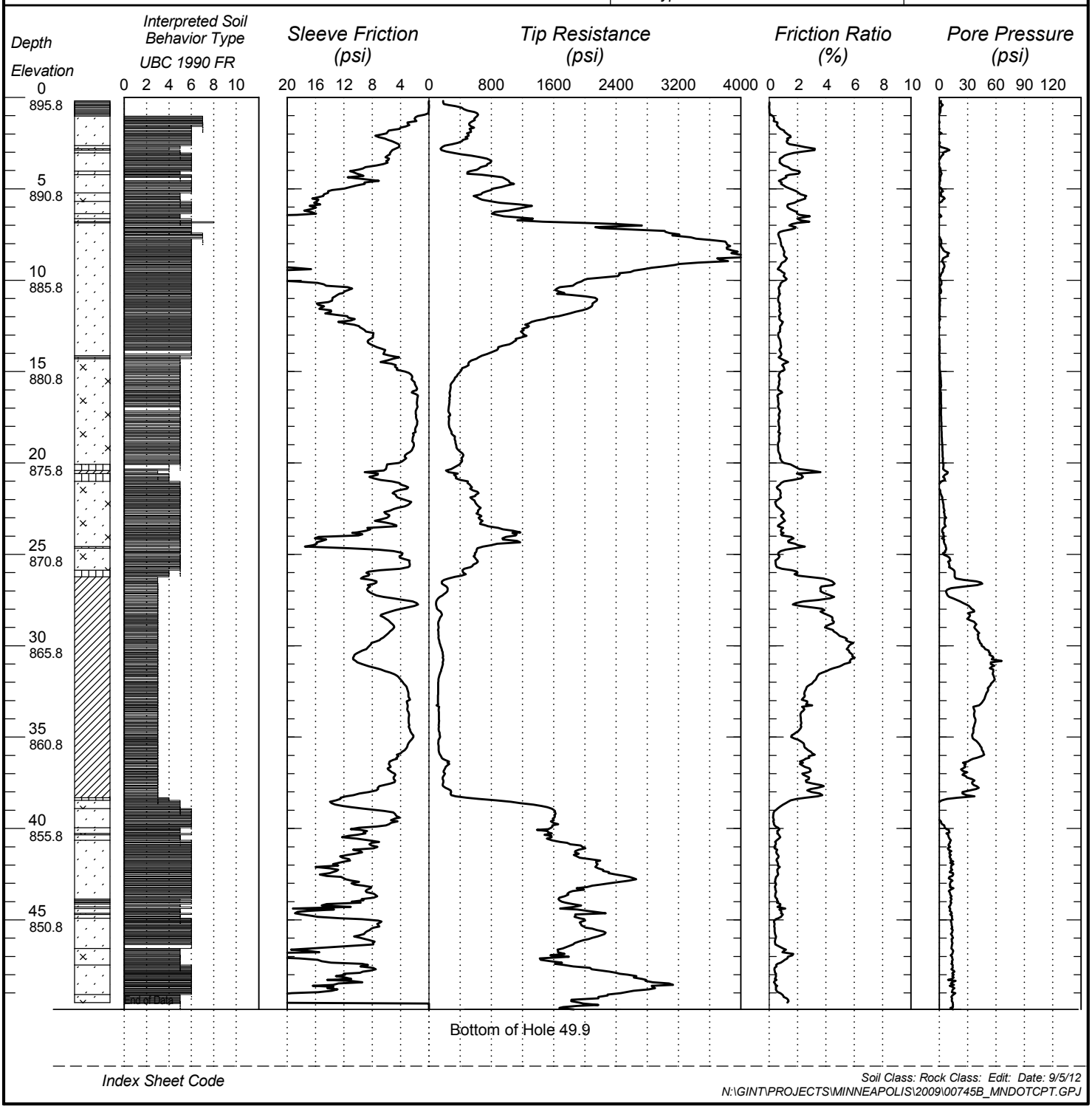
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-30**	**895.8** *(Surveyed)*

Location			
Co. Coordinate: X=503813 Y=153486 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	*CPT Operator* **Rowland**	*Date Completed*
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/19/12**



Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-31**	**899.7** *(Surveyed)*

Location			
Co. Coordinate: X=503873 Y=153594 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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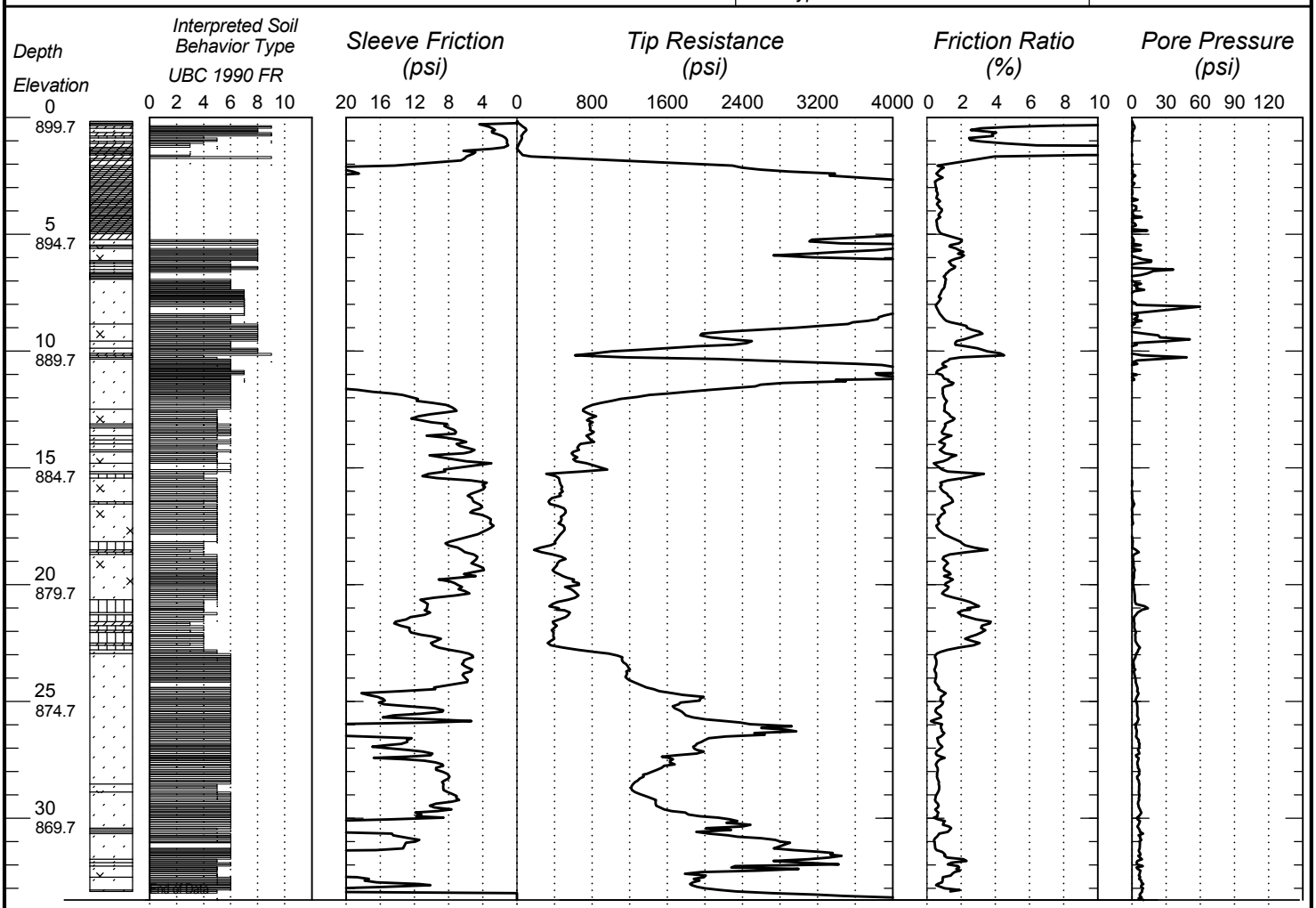
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/17/12**



Bottom of Hole 33.5

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

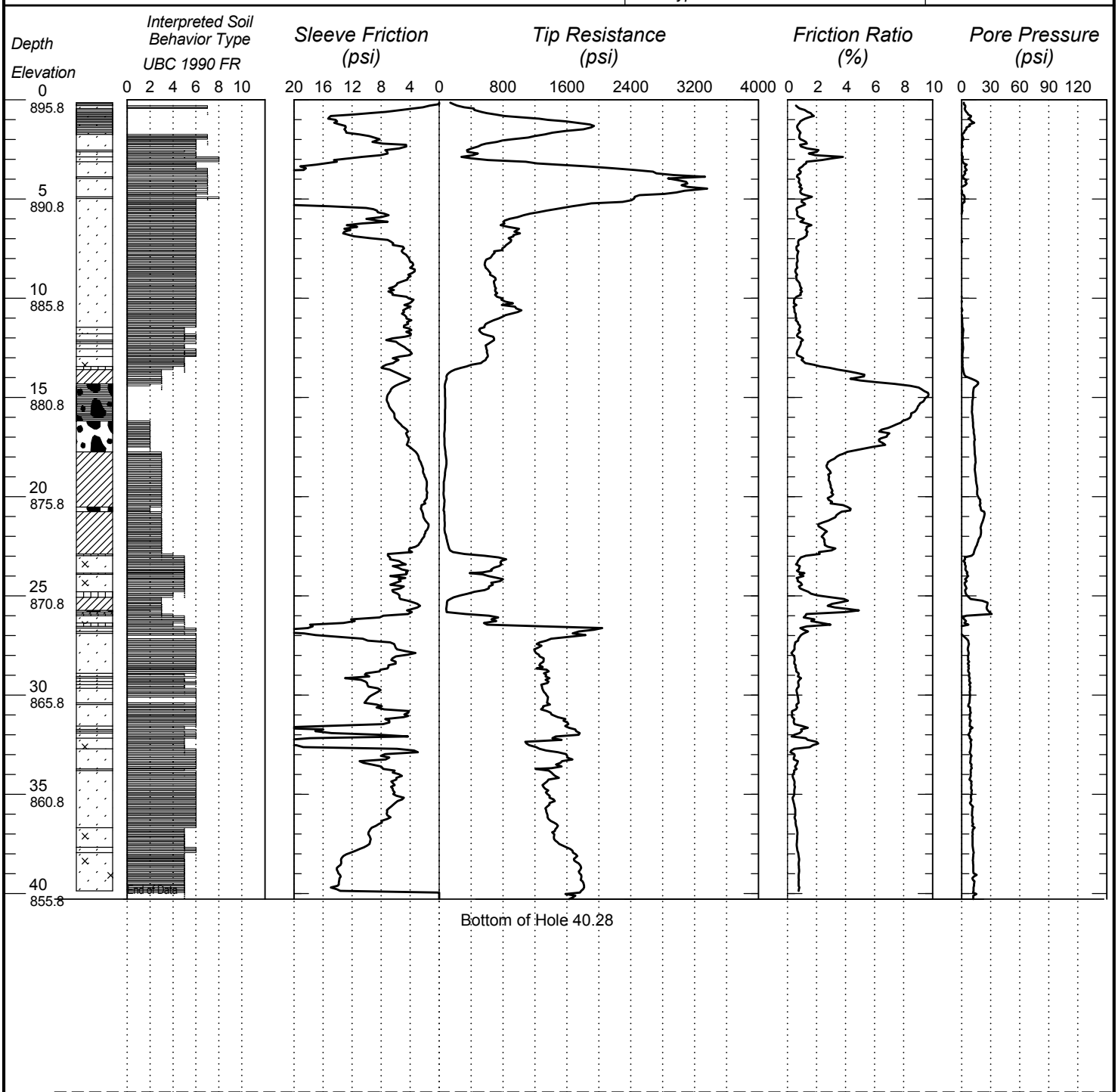
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-32**	**895.8** *(Surveyed)*

Location		CPT Machine	SHEET 1 of 1
Co. Coordinate: X=503910 Y=153509 (ft.)		**CPT-1**	
Latitude (North)= *Longitude (West)=*		CPT Operator **Rowland**	Date Completed
No Station-Offset Information Available		Hole Type **CPT-STD**	**7/19/12**



Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

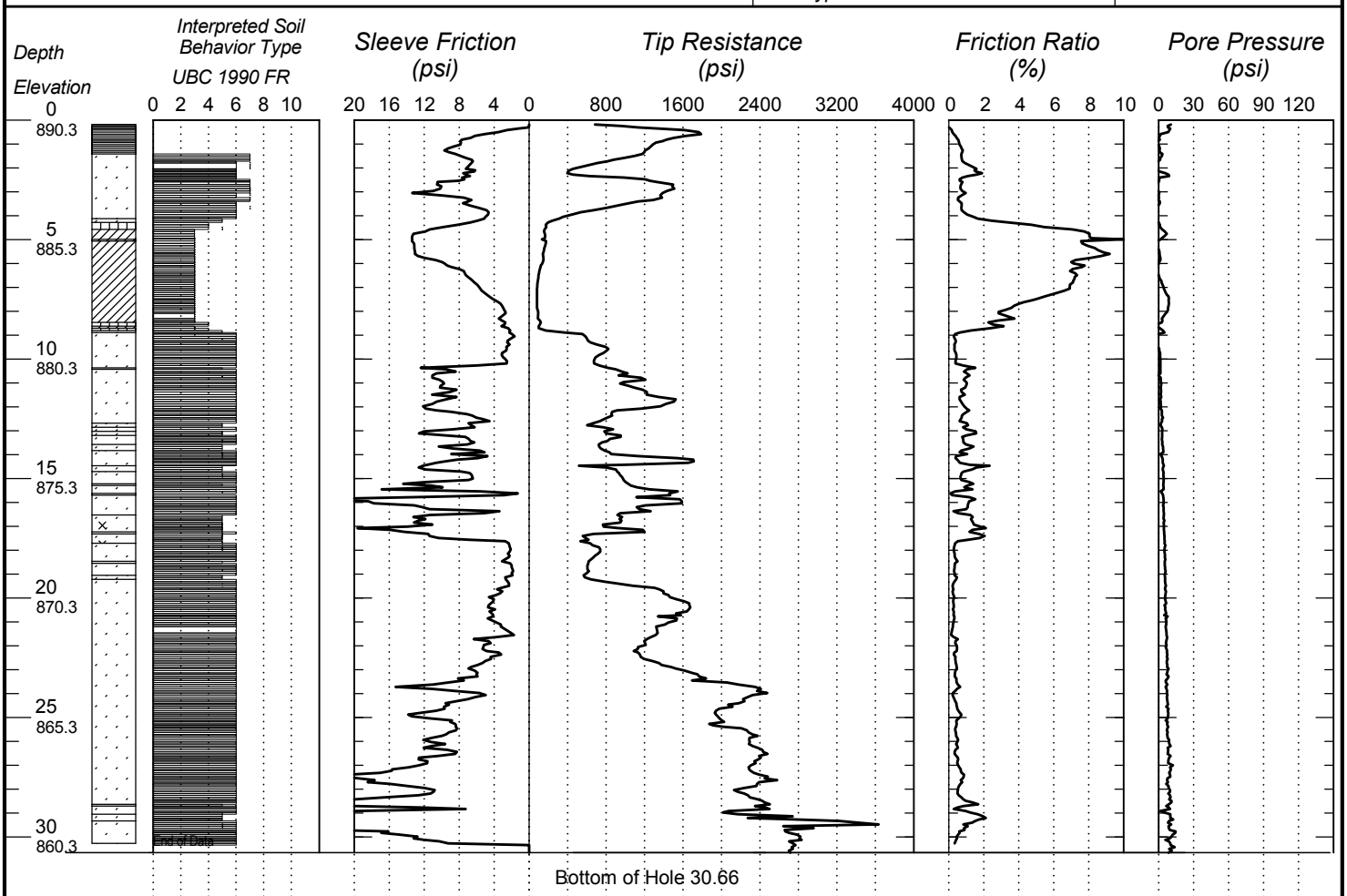
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-33**	**890.3** *(Surveyed)*

Location			
Co. Coordinate: X=503944 Y=153693 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/16/12**



Bottom of Hole 30.66

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

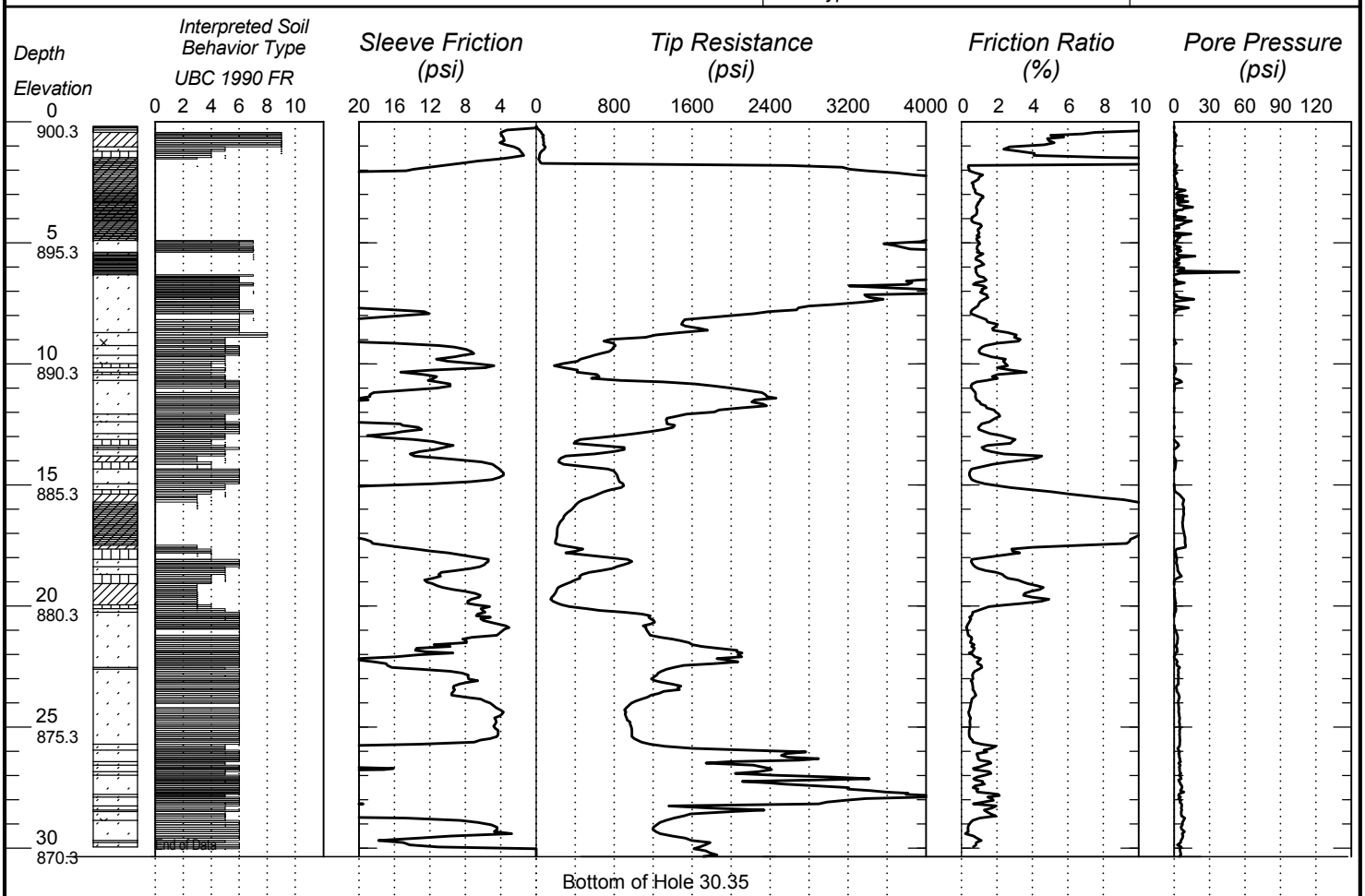
BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-34**	**900.3** *(Surveyed)*

Location			
Co. Coordinate: X=503972 Y=153613 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
Latitude (North)= *Longitude (West)=*	CPT Operator **Rowland**	*Date Completed*
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/17/12**



Bottom of Hole 30.35

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-35**	**891.5** *(Surveyed)*

Location			
Co. Coordinate: X=504044 Y=153702 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
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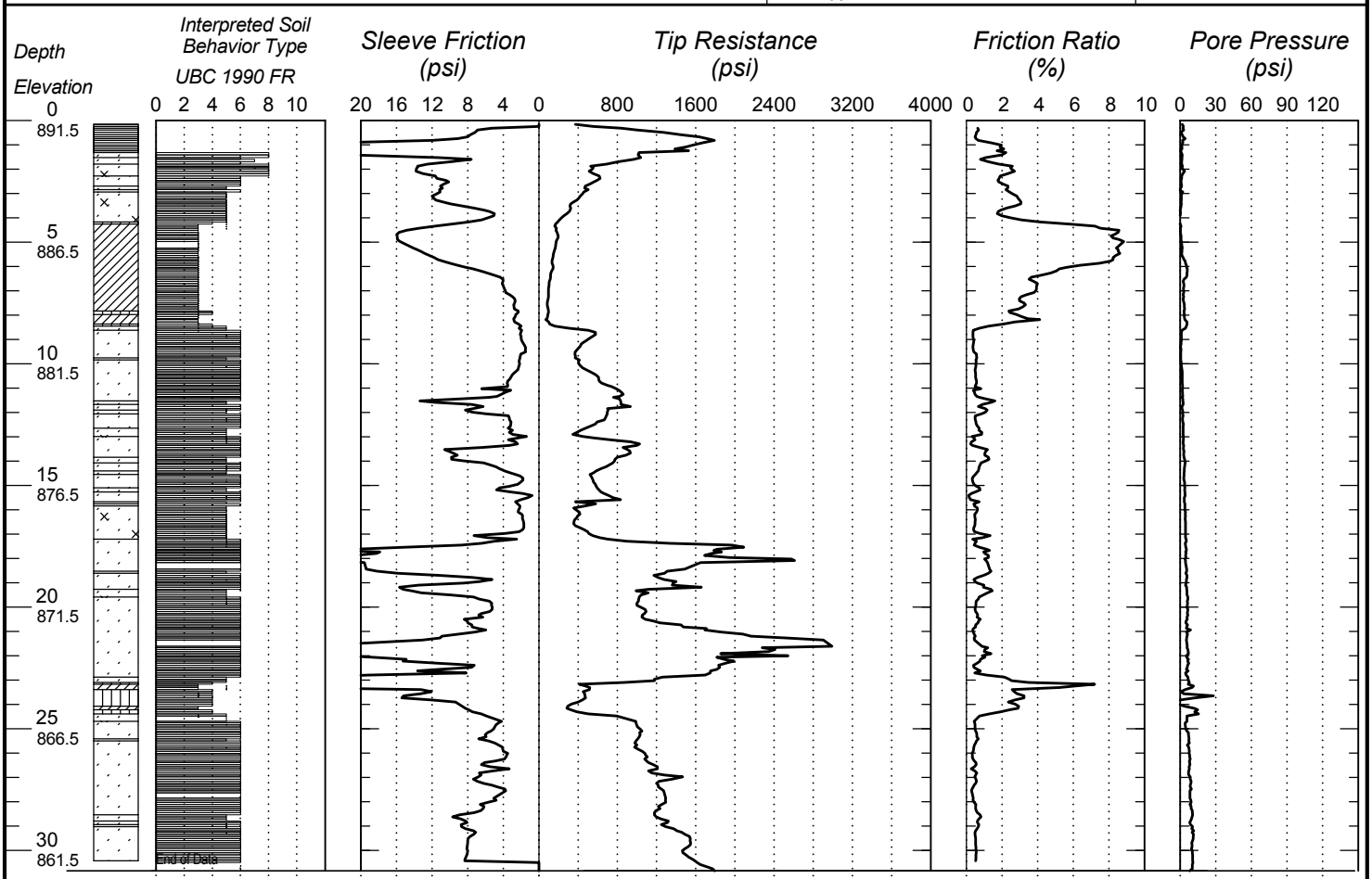
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/16/12**



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Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-36**	**900.9** *(Surveyed)*

Location			
Co. Coordinate: X=504070 Y=153633 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
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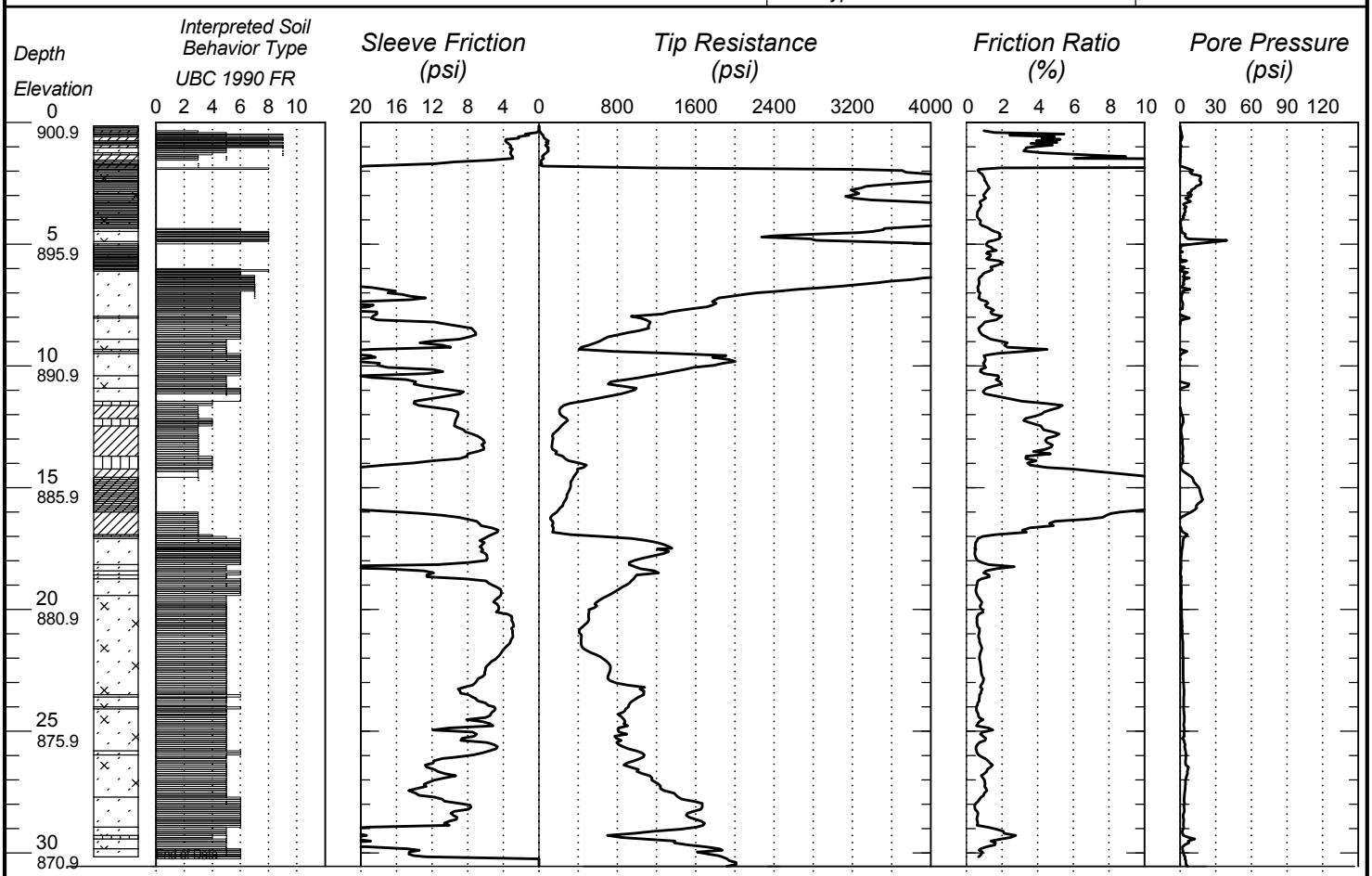
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/17/12**



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Index Sheet Code

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-37**	**895.2** *(Surveyed)*

Location			
Co. Coordinate: X=504144 Y=153708 (ft.)	*CPT Machine* **CPT-1**	*SHEET 1 of 1*
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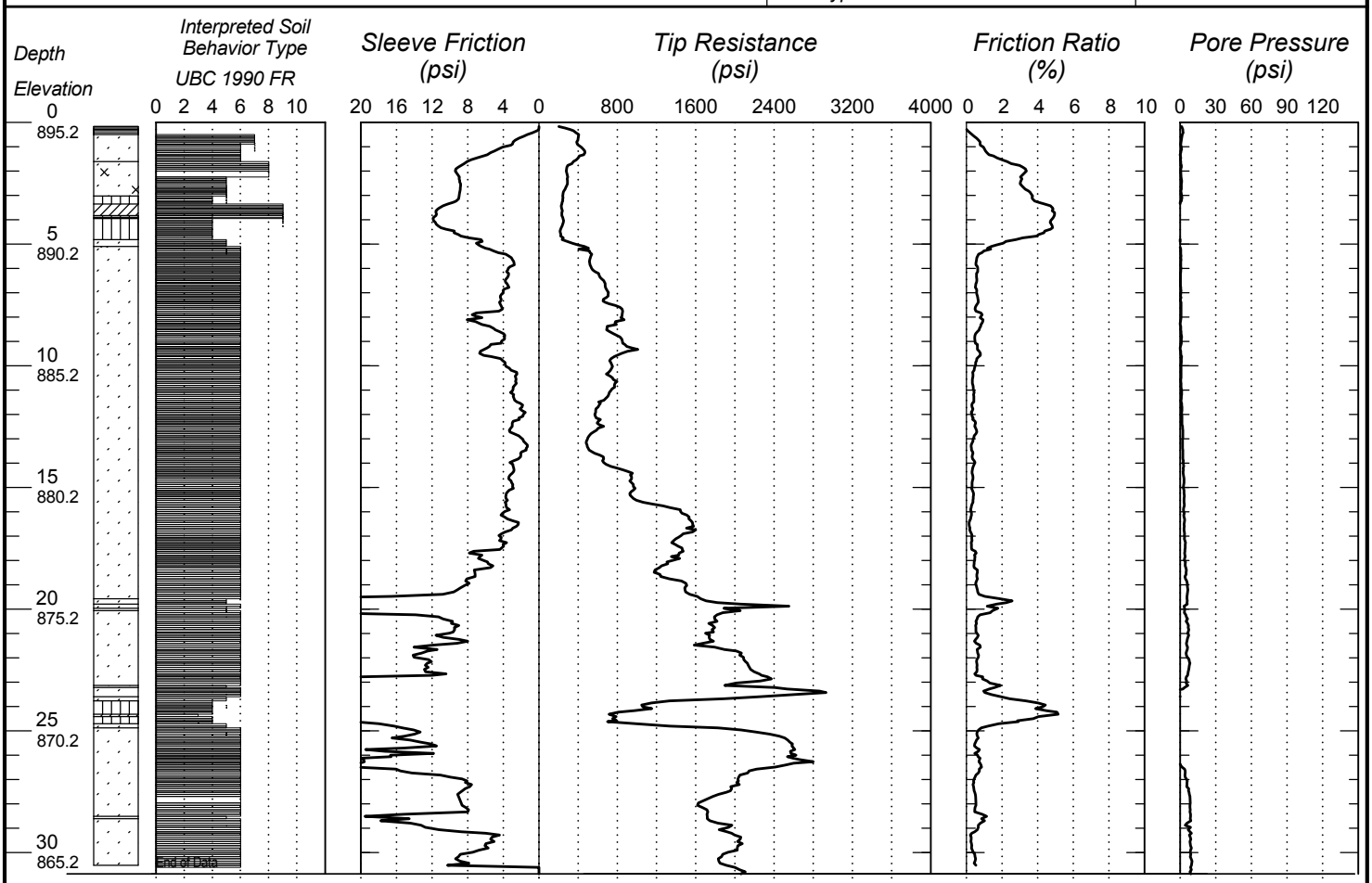
No Station-Offset Information Available	*Hole Type* **CPT-STD**	**7/16/12**



Bottom of Hole 30.88

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Soil Class: Rock Class: Edit: Date: 9/5/12
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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-38**	**901.8** *(Surveyed)*

Location			
Co. Coordinate: X=504168 Y=153651 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
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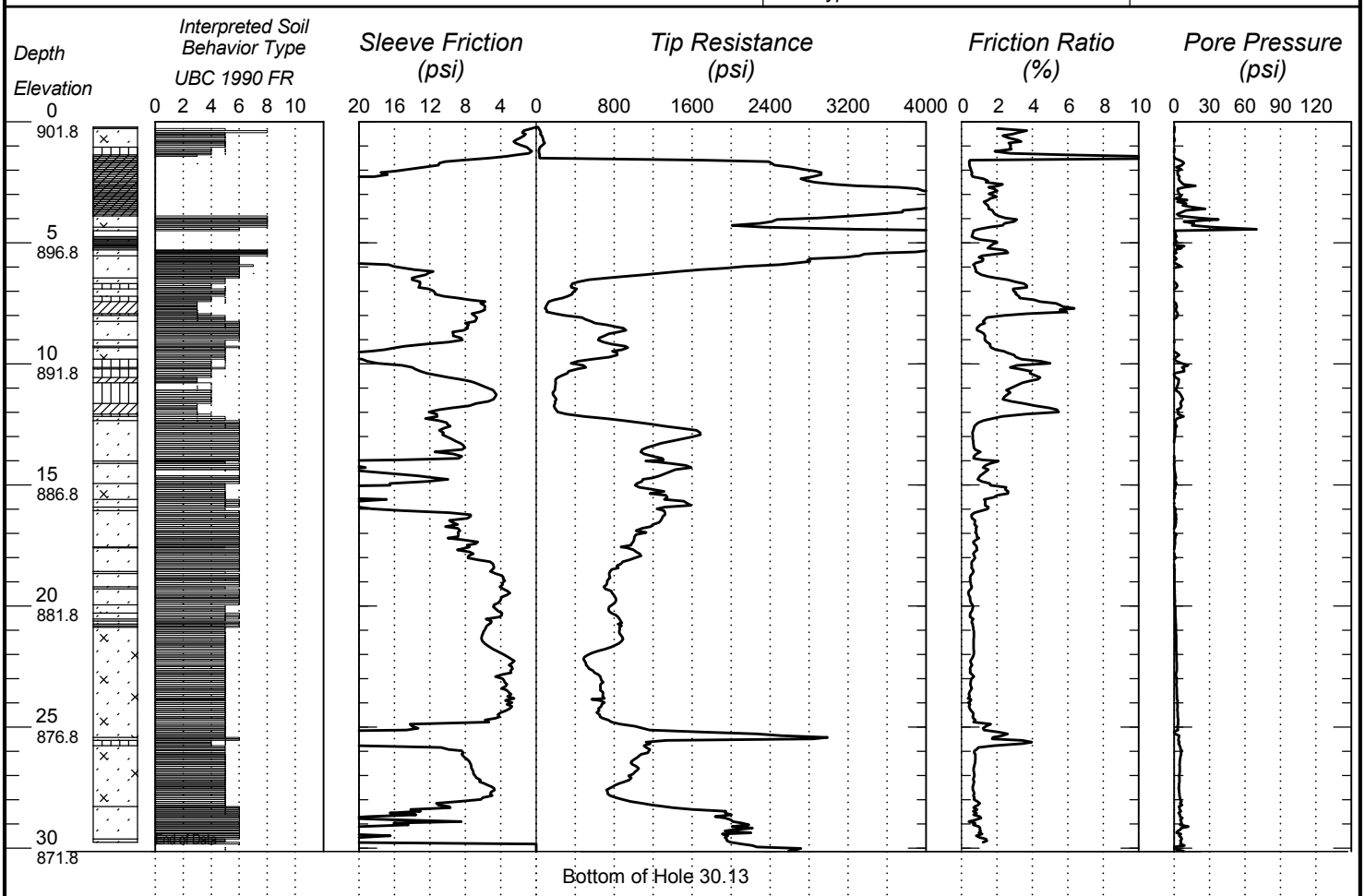
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/17/12**



Bottom of Hole 30.13

Index Sheet Code

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MINNESOTA DEPARTMENT OF TRANSPORTATION - GEOTECHNICAL SECTION

CONE PENETRATION TEST RESULTS

BRAUN INTERTEC

UNIQUE NUMBER

U.S. Customary Units

State Project	Bridge No. or Job Desc.	Trunk Highway/Location	Sounding No.	Ground Elevation
		TH 7 & Louisiana Ave	**C-39**	**895.8** *(Surveyed)*

Location			
Co. Coordinate: X=504181 Y=153559 (ft.)	CPT Machine **CPT-1**	*SHEET 1 of 1*
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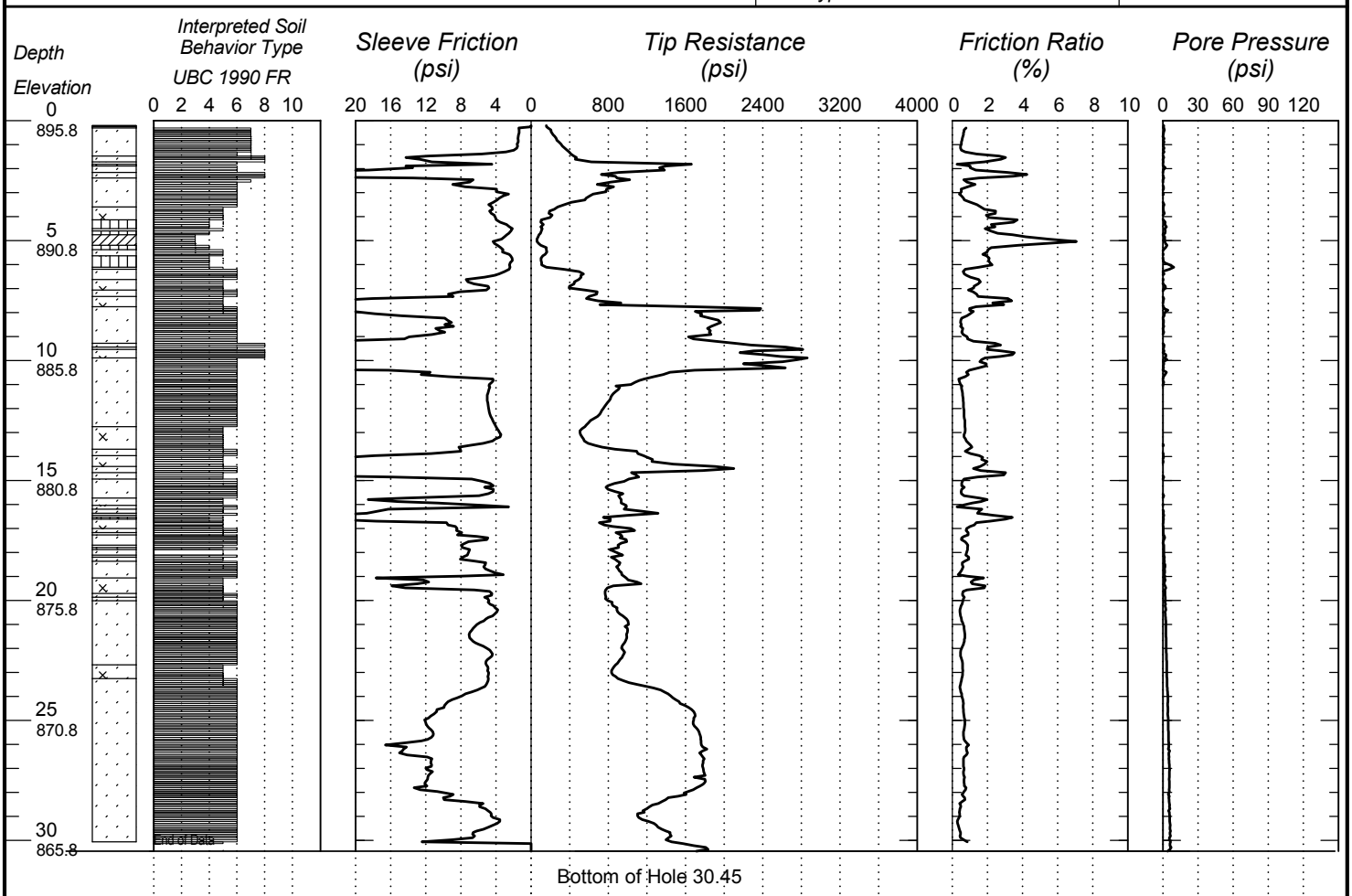
No Station-Offset Information Available	Hole Type **CPT-STD**	**7/19/12**



Bottom of Hole 30.45

Index Sheet Code

Soil Class: Rock Class: Edit: Date: 9/5/12
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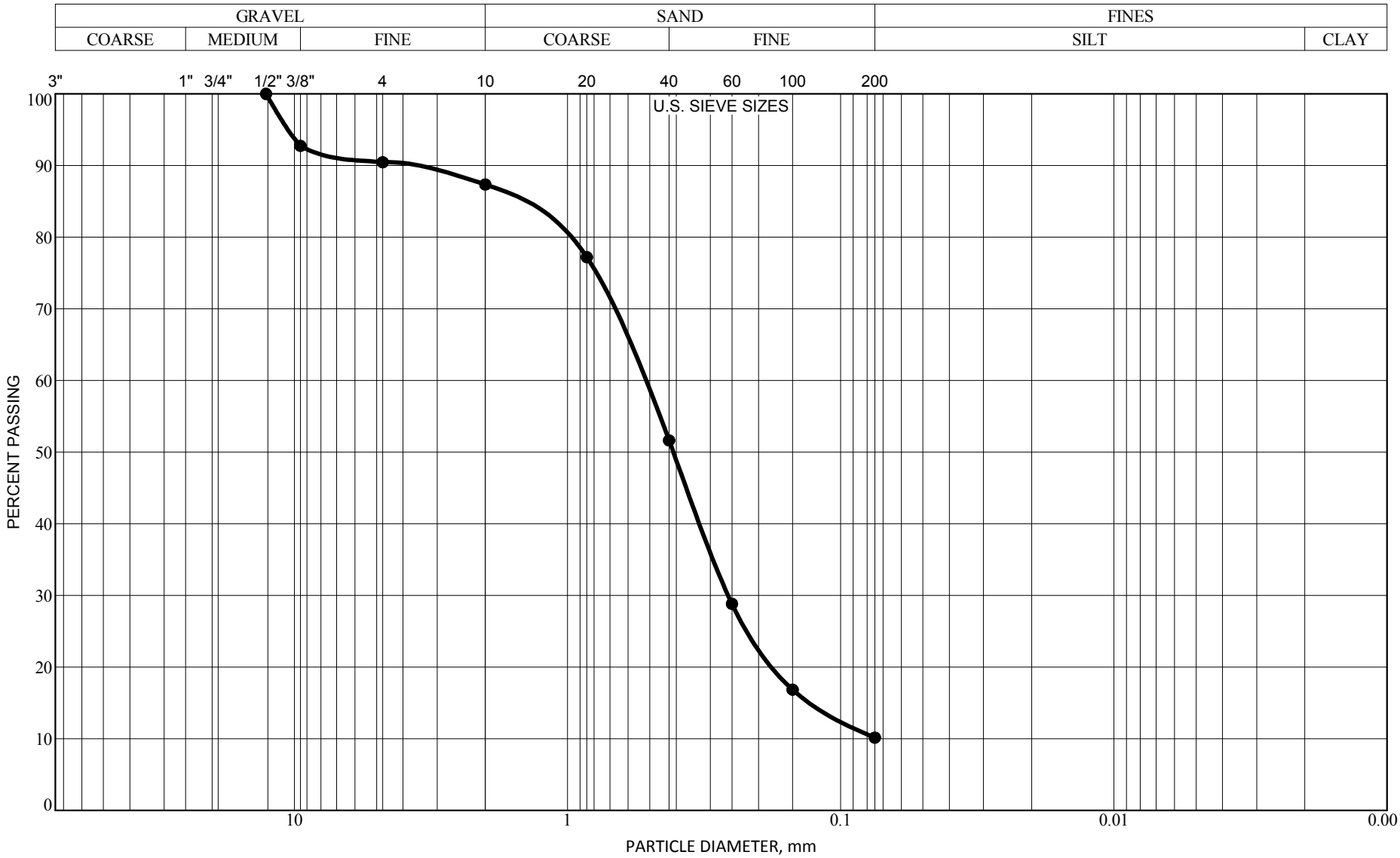
Appendix C

GRAIN SIZE ACCUMULATION CURVE (Mn/DOT)



BRAUN INTERTEC

Braun Project BL-09-00745B
Additional Soil Borings and Testing
TH 7 & Louisiana Ave Design
TH 7 & Louisiana Avenue
St. Louis Park, MN

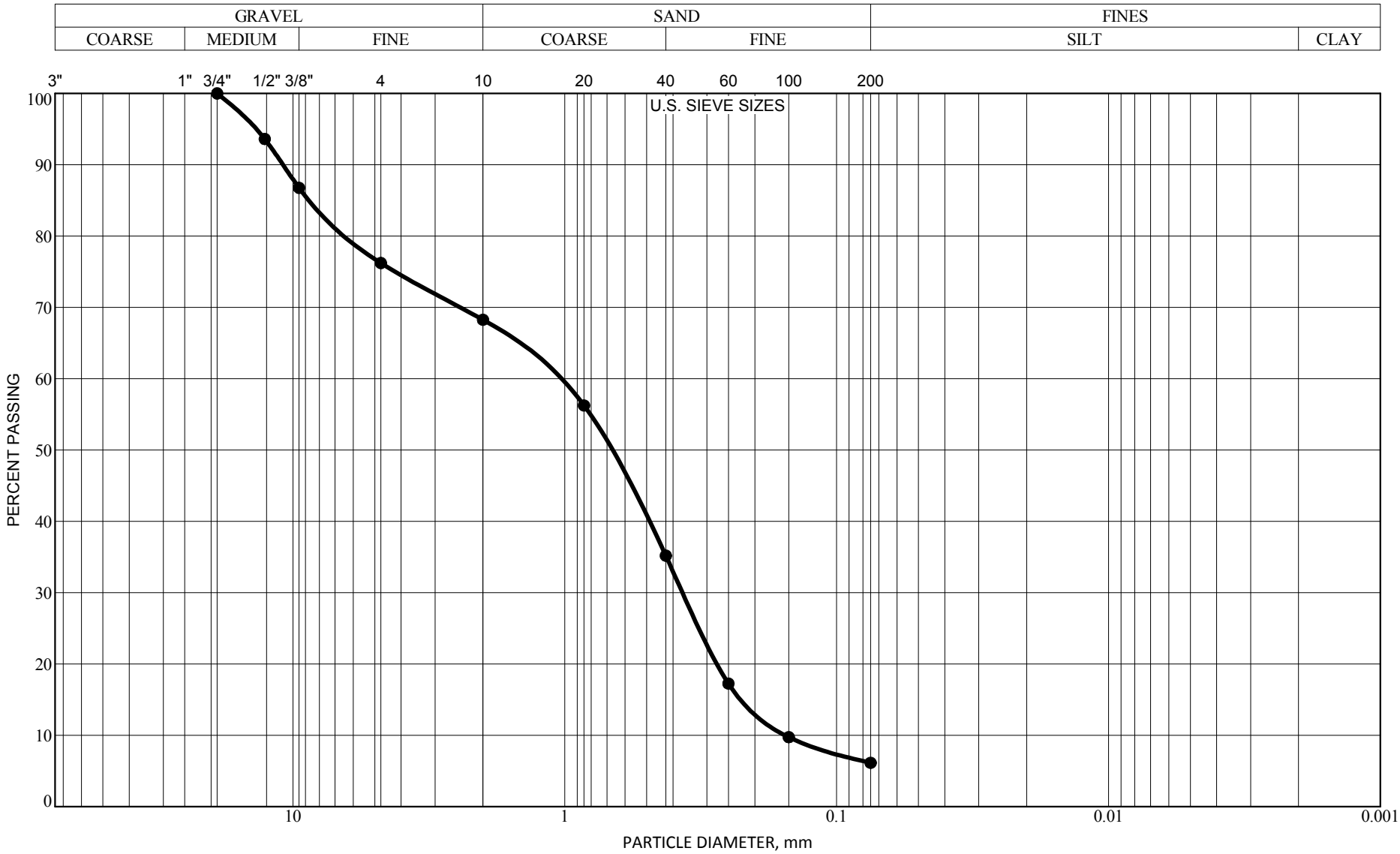
BORING: C-29 DEPTH: 10.0'-15.0'

GRAVEL	12.7%
SAND	77.2%
FINES	10.2%

Mn/DOT Classification: Loamy SAND

MNDOTVERSOIN2 N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\MINNEAPOLIS\2009\BL-09-00745B.GPJ BRAUN_V8_CURRENT.GDT 8/21/12 13:05

GRAIN SIZE ACCUMULATION CURVE (Mn/DOT)



BRAUN INTERTEC

Braun Project BL-09-00745B
Additional Soil Borings and Testing
TH 7 & Louisiana Ave Design
TH 7 & Louisiana Avenue
St. Louis Park, MN

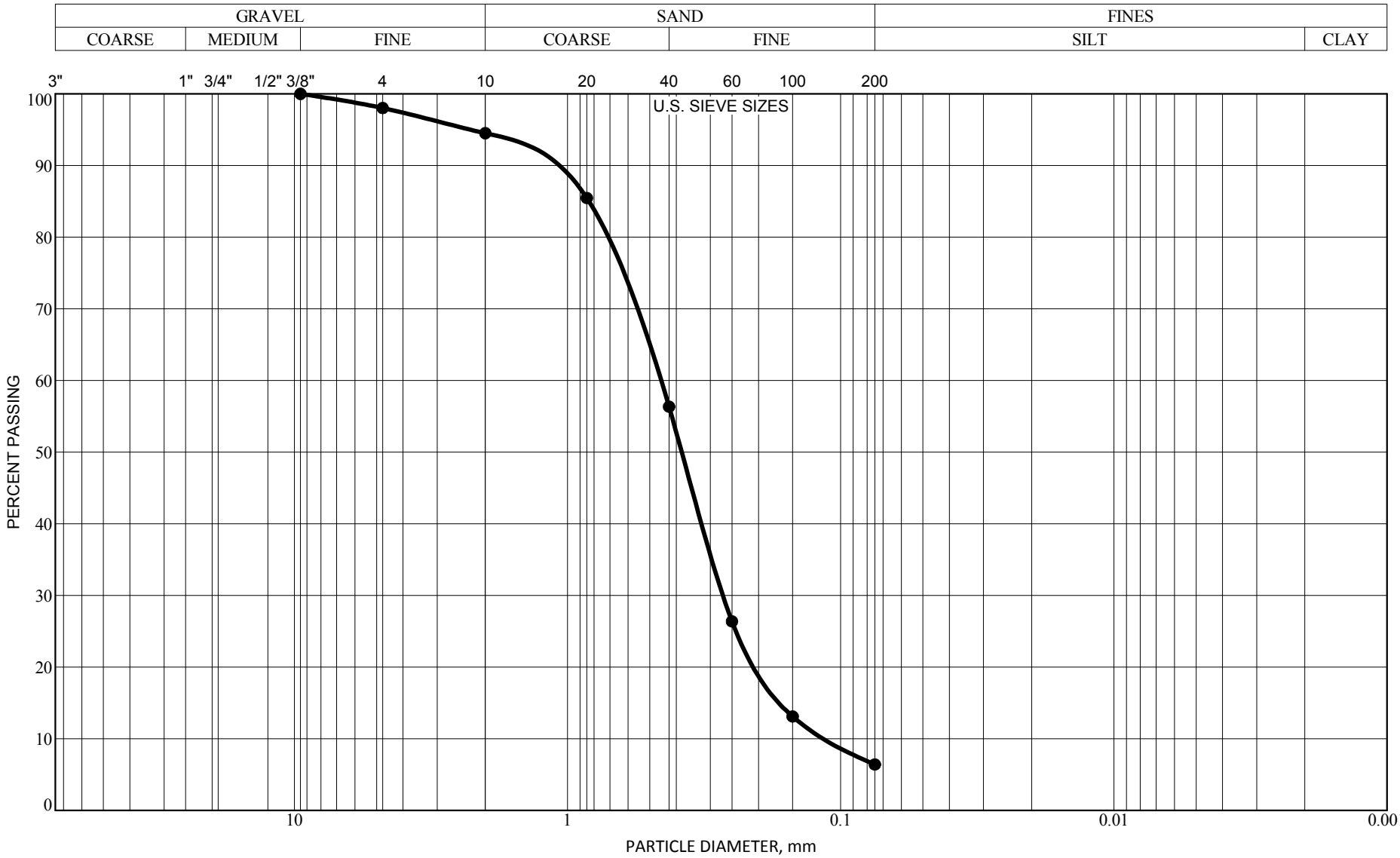
BORING: C-30 DEPTH: 10.0'-15.0'

GRAVEL	31.7%
SAND	62.1%
FINES	6.1%

Mn/DOT Classification: GRAVELLY SAND

MNDOTVERSOIN2 N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\MINNEAPOLIS\2009\BL-09-00745B.GPJ BRAUN_V8_CURRENT.GDT 8/21/12 13:05

GRAIN SIZE ACCUMULATION CURVE (Mn/DOT)



BRAUN INTERTEC

Braun Project BL-09-00745B
Additional Soil Borings and Testing
TH 7 & Louisiana Ave Design
TH 7 & Louisiana Avenue
St. Louis Park, MN

BORING: C-30 DEPTH: 15.0'-19.5'

GRAVEL	5.5%
SAND	88.1%
FINES	6.4%

Mn/DOT Classification: SAND

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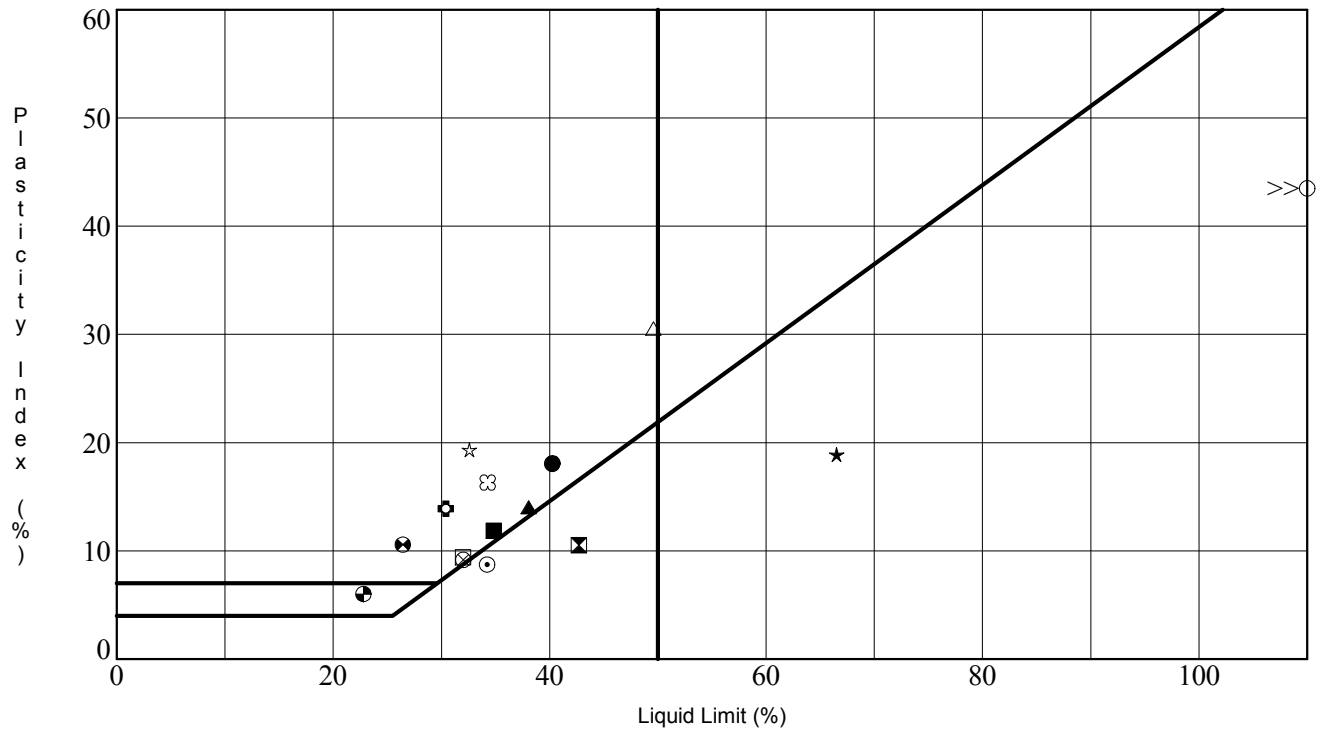

	Specimen Identification		LL	PL	PI	Fines	Classification
●	C-19	23.0'-25.0'	40	22	18		
⊠	C-20	15.0'-17.0'	43	32	11		
▲	C-20	17.0'-18.5'	38	24	14		
★	C-25	27.0'-29.5'	67	48	19		
⊙	C-25	30.0'-32.0'	34	25	9		
✿	C-26	24.0'-25.0'	30	17	13		
○	C-26	30.0'-32.0'	111	68	43		
△	C-29	23.5'-25.0'	50	19	31		
⊗	C-29	25.0'-28.0'	32	23	9		
⊕	C-30	27.0'-30.5'	40	22	18		
□	C-30	35.0'-39.0'	32	23	9		
◓	C-34	19.0'	26	16	10		
◔	C-34	24.0'	23	17	6		
☆	C-35	7.5'-10.0'	33	13	20		
⊠	C-36	12.0'-15.0'	34	18	16		
■	X-3	20.0'-25.0'	35	23	12		

Braun Project BL-09-00745B
Additional Soil Borings and Testing
TH 7 & Louisiana Ave Design
TH 7 & Louisiana Avenue
St. Louis Park, MN

ATTERBERG LIMITS RESULTS

BRAUN INTERTEC

ATTERBERG LIMITS N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\MINNEAPOLIS\2009\BL-09-00745B.GPJ BRAUN_V8_CURRENT.GDT 8/21/12 12:11

Minnesota Department of Transportation Geotechnical Section

Boring Log Descriptive Terminology (English Units)

USER NOTES, ABBREVIATIONS AND DEFINITIONS - Additional information available in Geotechnical Manual.

This boring was made by ordinary and conventional methods and with care deemed adequate for the Department's design purposes. Since this boring was not taken to gather information relating to the construction of the project, the data noted in the field and recorded may not necessarily be the same as that which a contractor would desire. While the Department believes that the information as to the conditions and materials reported is accurate, it does not warrant that the information is necessarily complete. This information has been edited or abridged and may not reveal all the information which might be useful or of interest to the contractor. Consequently, the Department will make available at its offices, the field logs relating to this boring.

Since subsurface conditions outside each borehole are unknown, and soil, rock and water conditions cannot be relied upon to be consistent or uniform, no warrant is made that conditions adjacent to this boring will necessarily be the same as or similar to those shown on this log. Furthermore, the Department will not be responsible for any interpretations, assumptions, projections or interpolations made by contractors, or other users of this log.

Water levels recorded on this log should be used with discretion since the use of drilling fluids in borings may seriously distort the true field conditions. Also, water levels in cohesive soils often take extended periods of time to reach equilibrium and thus reflect their true field level. Water levels can be expected to vary both seasonally and yearly. The absence of notations on this log regarding water does not necessarily mean that this boring was dry or that the contractor will not encounter subsurface water during the course of construction.

WATER MEASUREMENT
AB.....After Bailing
AC.....After Completion
AF.....After Flushing
w/C.....with Casing
w/M.....with Mud
WSD.....While Sampling/Drilling
w/AUG.....with Hollow Stem Auger

MISCELLANEOUS
NA.....Not Applicable
w/.....with
w/o.....with out
sat.....saturated

DRILLING OPERATIONS
AUG.....Augered
CD.....Core Drilled
DBD.....Disturbed by Drilling
DBJ.....Disturbed by Jetting
PD.....Plug Drilled
ST.....Split Tube (SPT test)
TW.....Thinwall (Shelby Tube)
WS.....Wash Sample
NSR.....No Sample Retrieved
WH.....Weight of Hammer
WR.....Weight of Rod
Mud.....Drilling Fluids in Sample
CS.....Continuous Sample

SOIL/CORE TESTS
SPT N_{60}.....ASTM D1586 Modified
Blows per foot with 140 lb. hammer and a standard energy of 210 ft-lbs. This energy represents 60% of the potential energy of the system and is the average energy provided by a Rope & Cathead system.
MC.....Moisture Content
COH.....Cohesion
?.....Sample Density
LL.....Liquid Limit
PI.....Plasticity Index
F.....Phi Angle
REC.....Percent Core Recovered
RQD.....Rock Quality Description
(Percent of total core interval consisting of unbroken pieces 4 inches or longer)
ACL.....Average Core Length
(Average length of core that is greater than 4 inches long)
Core Breaks.....Number of natural core breaks per 2-foot interval.

DISCONTINUITY SPACING

Fractures	Distance	Bedding
Very Close	<2 inches	Very Thin
Close	2-12 inches	Thin
Mod. Close	12-36 inches	Medium
Wide	>36 inches	Thick

RELATIVE DENSITY

Compactness - Granular Soils	BPF
very loose	0-4
loose	5-10
medium dense	11-24
dense	25-50
very dense	>50

Consistency - Cohesive Soils	BPF
very soft	0-1
soft	2-4
firm	5-8
stiff	9-15
very stiff	16-30
hard	31-60
very hard	> 60

COLOR

blk	Black	**wht**	White
grn	Green	**brn**	Brown
orng	Orange	**yel**	Yellow
dk	Dark	**lt**	Light
IOS	Iron Oxide Stained		

GRAIN SIZE /PLASTICITY

VF	Very Fine	**pl**	Plastic
F	Fine	**slpl**	Slightly Plastic
Cr	Coarse		

SOIL/ROCK TERMS

C	Clay	**Lmst**	Limestone
L	Loam	**Sst**	Sandstone
S	Sand	**Dolo**	Dolostone
Si	Silt	**wx**	weathered

G.....Gravel (No. 10 Sieve to 3 inches)
Bldr.....Boulder (over 3 inches)
T.....till (unsorted, nonstratified glacial deposits)

DRILLING SYMBOLS

- Vane Shear Test
- WS — Washed Sample (Collected during plug drilling)
- Augered
- Plug Drilled
- Split Tube Sample (SPT N_{60} 2 in. spilt tube with liners)
- Thin Wall Sample (3 in. Shelby Tube)
- Core Drilled (NV Core Barrel unless otherwise noted)
- CS — Continuous Soil Sample
- A/J — Augered & Jetted
- Jet — Jetted
- A/P — Augered & Plug Drilled

Mn/DOT Triangular Textural Soil Classification System